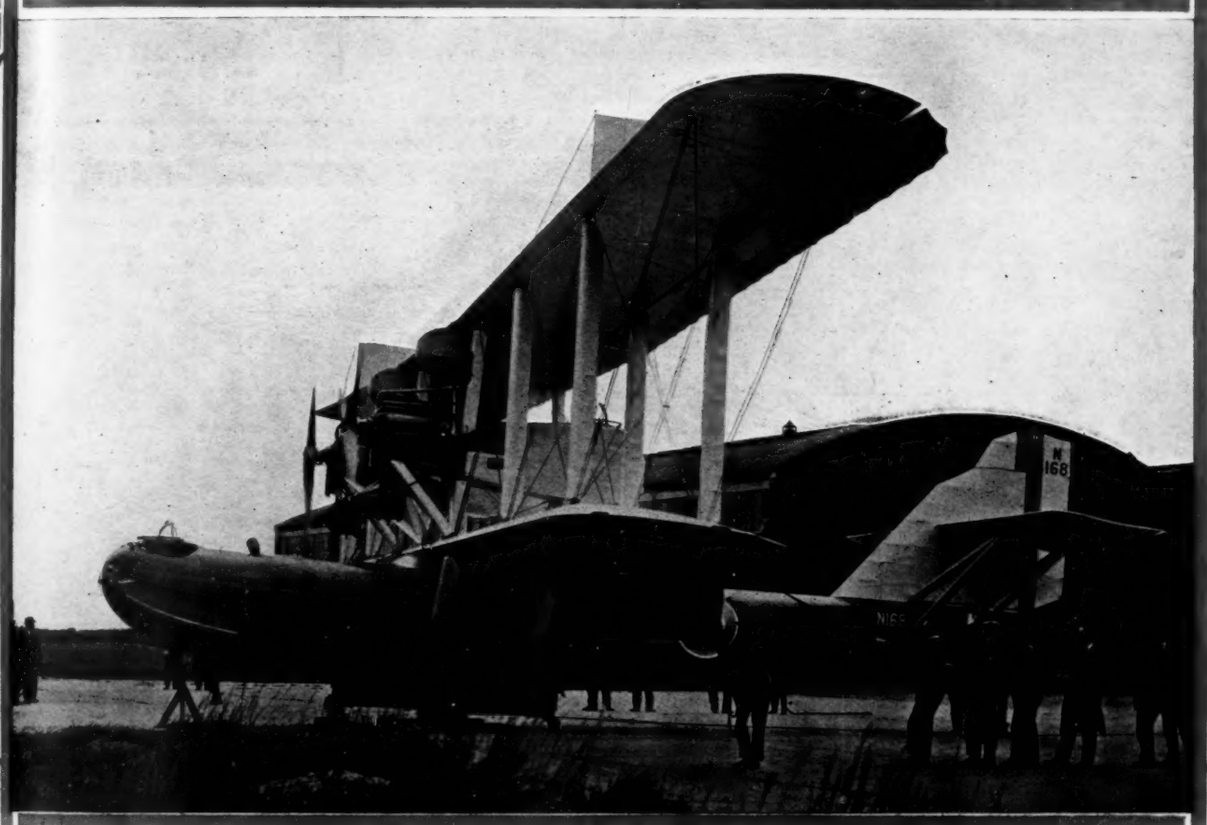
AVIATION

The Oldest American Aeronautical Magazine

AUGUST 11, 1924 Issued Weekly PRICE 10 CENTS



The world's largest flying boat, the Titania, recently completed in England (two Napier Lion engines)

Photo Wide World

VOLUME XVII

NUMBER 6

SPECIAL FEATURES

LOENING AMPHIBIAN PLANES ORDERED

A $6,000,000 ERROR IN AIR SERVICE COSTS

AEROMARINE MODEL EO SPORT FLYING BOAT

THE 15TH ANNIVERSARY OF OUR AIR SERVICE

GARDNER PUBLISHING CO., INC.

HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK

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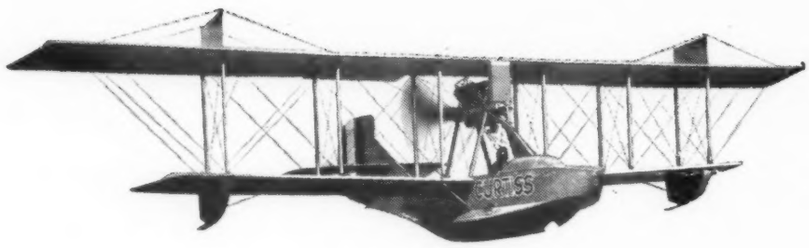
FLYING BOAT OPPORTUNITY



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AUGUST 11, 1924

AVIATION

VOL. XVII. NO. 6

Published every Monday

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Vol. XVII AUGUST 11, 1924 No. 6

More Premature Plans

AVIATION has been conservative in its comment on some of the plans that have been heralded widely for the airship development of the Navy. The North Pole venture was not advisable when viewed from the position that we occupy in trying to promote aeronautical progress. We prefer to regard the large investment that has been made by the government in airships and their equipment as justified on the grounds of national defense and their use as naval cruisers.

Until the Shenandoah and ZR3 are given every possible test along these lines it seems premature to make plans for any commercial utilization of airships by the government.

The following Washington dispatch gives the sort of announcement that we think is premature and gives an impression of exaggerated uses for government airships:

"The most ambitious plans ever projected for exploration of the hidden corners of the globe are under consideration here for the dirigible Shenandoah and her sister airship, the ZR3, it was learned today.

"Prior to these ambitious undertakings the navy will insist on proving both craft airworthy. Cruises will be made across the United States to the Pacific coast, thence to Hawaii and the Panama Canal and the Central American republics, and thence through the West Indies.

"1. Flights around the world by both airships, one traveling west and the other going east.

"2. Flights to South America to cement friendly relations between the peoples of the North and South American republics and to gather a mass of geographic, geologic, aerological and oceanographic data.

3. Exploration in the million-square-mile unexplored territory between Alaska and the North Pole, which may reveal a new continent and a 'lost" race.

"4. Regular Government air mail service from New York to London."

Until facilities, such as the mooring mast, have been proven trustworthy, and adequate handling accommodations are available, such ambitious plans can only serve to create an impression that the minds of those charged with our airship experimentation are not centered on the main problem—that of determining whether or not airships have military or naval value commensurate with their cost.

A Detailed Aircraft Budget

THE fourth plank of the Suggested National Air Policy, one of which AVIATION is discussing editorially every week, calls for "a detailed aircraft budget for all Governmental departments and an annual statement of all expenditures."

It is peculiarly opportune that this part of the policy is up for discussion this week, as in this issue there appears what we believe is the first detailed statement of aircraft expenditures of the Army that has ever been made public. And quite as important is the convincing proof it carries of the necessity of having such figures made public, for we frankly doubt whether the error of six million dollars would have come to public notice had AVIATION not requested these figures.

As will be noted, the detailed statements that it is suggested be given to the public are of two kinds: first, the budget, and second, how the budget as allowed was spent. One is of little value without the other. The aerial activities of the government are scattered through too many departments and too many bureaus to permit of proper study unless they can be secured in advance of their adoption. This has not been possible heretofore.

Every effort will be made in the future to secure these detailed estimates as they are presented to Congress, so that they may be discussed while they are under consideration. Much duplication and unnecessary expenditures would probably be found if the aerial estimates of all the Departments could be placed side by side.

But more important than the budget figures would be a detailed accounting for moneys expended. It is admittedly difficult to give in detail how millions of dollars are to be spent. Furthermore, the public relies on the high purposes of government officers and their integrity in making expenditures. But when appropriations have been spent, the public is entitled to know how its money was used and to facts which will indicate whether it was expended with the greatest returns and results. This is the only way the public has of judging public servants.

By all the standards of business practise, as well as good public policy, a yearly accounting is fundamental.

Maclaren Forced Out

THAT Major Stuart Maclaren has been forced to abandon his flight around the world is a matter of sincere regret to all Americans. The attempt was made against tremendous odds, there was little if any advance preparation, no stocks of spares were cached at frequent intervals along the route, no buoys placed in advance, no destroyers to rush spare parts and, worst of all, the flight seems to have been meagerly financed and hastily planned. The more credit must therefore be given to the Major and his associates. They showed typical British determination, throwing themselves into a well nigh impossible task with all the strength that was in them.

The aviators seemed to have been dogged by hard luck from the very beginning and were so much behind schedule that it is doubtful whether they would have gotten to the Atlantic before the storms of autumn would have made the crossing impossible.

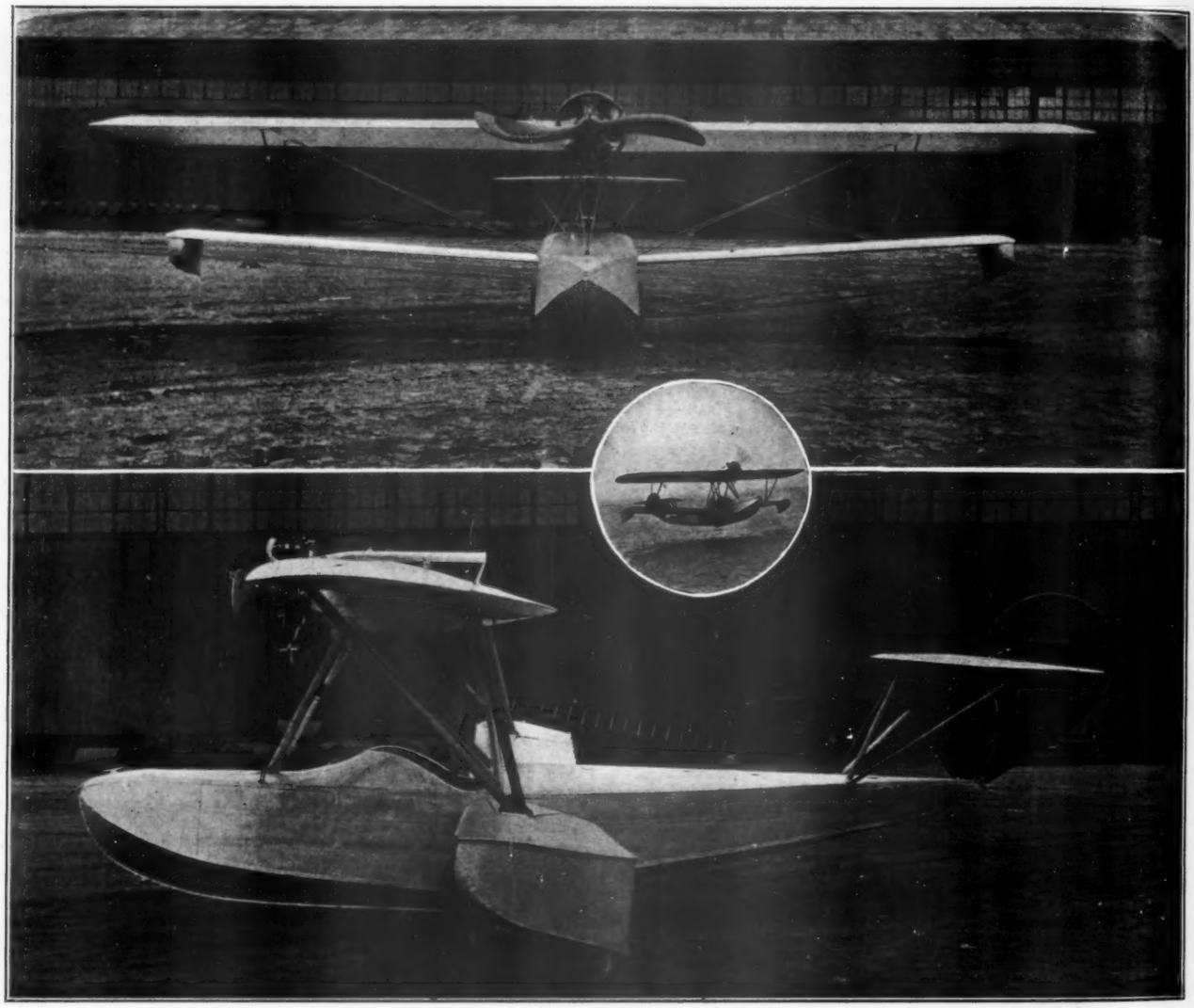
Two of our own men have been forced out of the race and we are sure that the American fliers appreciate more than any one the brave attempt which Maclaren has made and regret his ill luck.

The Aeromarine Model EO Sport Flying Boat

By B. V. KORVIN-KROUKOVSKY

Engineer in Charge of Airplane Design, Aeromarine Plane and Motor Co.

The following description and data regarding the three-seater sport flying boat recently built for Earl D. Osborn of AVIATION magazine, has been written in conjunction with P. G. Zimmerman, Chief Airplane Engineer of the Aeromarine Plane and Motor Co.



Three views of the new Aeromarine, model EO, sport flying boat, fitted wih a 70-80 hp. Anzani engine

Mr. Osborn wanted to have a modern flying boat to replace his old Aeromarine Model 44. The new boat was to be built around smaller engine to be more economical in gasoline and less troublesome in maintenance, yet was to carry the same useful load and to have the same or better performance than the older boat. The question of the safety was to be given particular consideration as the boats of this type, if any more will be built, will be used often by amateur pilots with but little experience. In fact it was considered desirable to have the type of the boat suitable for training, as well as for the sport use. A strong emphasis was laid on the balance of the boat with and without the passengers, and with power on and off. It is a well known fact, that the great majority of the present day boats are hopelessly deficient in this respect.

The proposal, covering the general layout of the machine to be constructed, was submitted to Mr. Osborn for approval on Jan. 26, 1924. The first test flights were conducted on June 28, 1924. It was a very fortunate circumstance that not only was Mr. Osborn the pilot himself, but he was also very closely connected in past with the development of the Aeromarine Airways, and later witnessed the development of the Aeromarine Model AMC flying boat, the first flying boat built in this country with an all metal hull. Thus, at the very beginning of the work, the ideas of Mr. Osborn regarding the future boat were found to be generally in accord with the ideas of the Aeromarine engineers, and the final shape of the project was drawn by mutual agreements, rather than by compromises.

Pending the development of a small air cooled engine with more than three cylinders in this country, the six cylinder

Anzani Type 6A3 was chosen. The engine installation was so designed, however, that any radial engine of about the same horsepower and weight can be readily fitted. At present time this allows the choice of Wright L4, LeRhône 80 hp. and Clerget, besides the Anzani mentioned before.

Advantages of Tractor Type

A rather radical departure from ordinary flying boat practice is found in the adoption of the tractor propeller and, as a result of this, the location of the pilot and passengers farther back under the upper wing. Several considerations governed the adoption of this disposition. The first one was the consideration of safety. Everybody who has flown pusher machines is familiar with the ever present fear lest anything will get into the propeller and cause disaster. This anxiety would still more be felt in case of a sport machine, where the passengers hardly can be expected to exercise much care in this respect. Again, in case of a crash there is no danger for the crew of being pinned under the motor, or jammed in the collapsed bow of the hull. It must be a very severe crash indeed to break the hull as far as the cockpit is located in this boat. In any case free exit from the cockpit toward the tail will be always available and can be enlarged, but not closed by the crash.

We often hear now, that development of the machines, as well as of the art of flying rendered the crashes rather rare occurrences and that the designer should think more about prevention of the crashes than about safety after the crash. The tractor propeller and the forward location of the motor score some points from this point of view as well. Were there any leaks in the gasoline system, the gasoline cannot get to the exhaust manifo'd and catch fire, as it almost always would in case of the pusher with radial engine. With an air-cooled motor the cooling is considerably better in case of the tractor than in case of the pusher. The improved cooling brings in turn greater reliability of the power plant. All these reasons, to be sure, are well recognized in case of the land machines, but as a matter of routine are still disputed for the flying boats.

Yet, however important, safety was not the only consideration that led to the adoption of the tractor propeller. The location of the pilot and passengers under the center of gravity of the machine makes for good balance under all conditions of the loading. There is no need here for shifting sand bags every time one wants to take an extra passenger. The tail surfaces get more pronounced downwash in case of the tractor than in case of the pusher. This feature, usually objected in the land machines, is invaluable in the case of flying boats, as it allows equally good balance to be obtained with the power on and off.

Aeromarine Practice Followed

Aside from the adoption of the tractor propeller and very pronounced stagger in wings, the little craft follows the modern Aeromarine practice. The hull has a large reserve buoyancy, and is built of aluminum alloy sheets and stamped shapes. In general construction it resembles its predecessor, the Aeromarine Model AMC flying boat launched last year. The wings, of wood and fabric construction, are arranged in the form of a single bay biplane with large upper and small lower panels. The engine and gasoline and oil tanks, with all the accessories, are carried in the aluminum alloy nacelle supported on the struts above the hull. These struts act as the center section for the upper wing panels, which are hinged on two sides of it. All nacelle, interplane and tail struts are made of streamline steel tubing, thus doing away with wood fairings. Long and narrow ailerons are fitted to the upper wing only, where they are well protected from the seas.

The specifications of the Aeromarine Model EO Sport Flying Boat are as follows:

General:

Type	Tractor biplane flying boat.
Purpose	Sport.
Seating capacity	Three.
Dimensions:	
Span, upper wing	38 ft. 0 in.
Span, lower wing	34 ft. 0 in.
Length, overall	25 ft. 2 in.
Chord, upper wing	5 ft. 0 in.
Chord, lower wing	3 ft. 0 in.
Angle of Incidence at hull	5 deg.
Angle of Incidence at struts	3.5 deg.
Dihedral, upper wing	None.
Dihedral, lower wing	3.5 deg.
Stagger on leading edges	3 ft. 5 in.
Sweepback	None.
Wing curve, upper	Aeromarine No. 2b
Wing curve, lower	Aeromarine No. 6
Areas:	
Upper wing, incl. ailerons	177 sq. ft.
Lower wing	89 sq. ft.
Total wing area	266 sq. ft.
Horizontal stabilizer	20.5 sq. ft.
Areas:	
Elevator	12.1 sq. ft.
Vertical fin	5.5 sq. ft.
Rudder	10.0 sq. ft.
Weights:	
Weight empty	1040 lb.
Disposable load--	
Light:	
Pilot and passenger	340 lb.
Anchor and rope	20 lb.
Gasoline (13 gals@6.1)	80 lb.
Oil (3 gal.)	20 lb.
Total light disposable load	460 lb.
Disposable load--heavy:	
Pilot and two passengers	510 lb.
Anchor and rope	20 lb.
Gasoline	150 lb.
Oil	30 lb.
Total heavy disposable load	710 lb.
Total weight loaded	1500-1750 lb.
Wing loading	5.64-6.58 lb./sq. ft.
Power loading	20-23.3 lb./hp.
Factor of safety	8-6.

Details of Construction

The wing frames consist of spruce I beams, spruce trussed ribs and spruce drag struts. The fittings are of steel, but the number of these in a single bay machine is rather small. The drag bracing in the upper wing is double as far as the strut fitting in order to resist the forces set by the large stagger of the wings. The lower wing has but one spruce and plywood box beam. This beam is attached to the steel tube, passing through the hull and interconnecting the right and left hand panels. The attachments at the tube and at the outer V struts are such as to resist the torque generated in the wing panel at high speed and in a dive. The attachments at the struts, moreover, allow the adjustment of the angle of incidence of the lower wing to be made. This adjustment can be used for balancing the propeller torque, as well as for varying the fore and aft balance of the boat. This latter is made possible by the location of the lower wing well back of the center of gravity of the machine.

The wing tip floats are attached at the very tips of the lower wing. These floats are made of the 17s alloy sheet stock and therefore are practically free from either leakage or soakage of water. The floats weigh but 7.5 lb. apiece.

The control system in this machine is so arranged, that the pulleys are entirely eliminated, and the cables where used run in straight lines without any guides or fairleads. The pilot's stick is connected by push and pull rod with the countershaft located just back of the seat. The lever on the countershaft is connected by the cables with the control horns on the elevators. The stick is mounted on the torque tube which runs in fore and aft direction in the hull, and carries the lever for the operation of the ailerons. The ailerons have the extension torque tubes with the levers at the sides of the nacelle over the cockpit. These levers are connected with the lever on the torque tube in the hull by means of the streamline push and pull rods, passing through the hollow seat back. This arrangement results in practical elimination of the friction and play in the operation of the ailerons. All joints of the push and pull rods and the levers are readily accessible for inspection. The countershaft in the hull, also readily accessible, is protected by the hinged cover from interference with the passengers.

The Power Plant

The complete power plant is assembled as one unit shown on one of the accompanying photographs. The nacelle is built up of sheet 17s alloy stock, and carries the fittings for the attachments of the nacelle support struts, for lifting the machine and for the attachment of the upper wings. The combined gasoline and oil tank is located between two bulkheads, one of which is provided at each of the wing beam attachments. The oil section of the tank is placed immediately behind the front of these bulkheads and serves to isolate the engine from the gasoline supply. The gasoline tank of 25 gal. capacity is divided in two parts, the service and the emergency sections, and is sufficient for more than four hours of flying at full throttle.

The engine itself is bolted to the front bulkhead of the nacelle, made from 17s alloy about 5/32 in. thick. The magnetos, oil pump and tachometer drive project inside of the nacelle where they are well protected from the elements.

Four handholes on the top and bottom of the nacelle allow convenient access to these important accessories.

The power plant is entirely self contained. Short gasoline piping under the nacelle connects the carburetor with the gasoline tanks. The cocks under the tanks can be reached in flight from the pilot's cockpit. The oil gage (pulsator) is mounted under the nacelle, very close to the oil pump, yet visible to the pilot. The tachometer is mounted on the side of the nacelle facing pilot, and the tachometer drive is less than foot long. The shortness and the simplicity of all these connections are expected to improve materially the reliability of the power plant. It is well known that more forced landings occur, due to the troubles in the installation, than due to the failure of the engine proper.

There is no spark advance on the Anzani magnetos, and the throttle and the ignition switch and wiring are the only engine controls needed. The lever mounted on the instrument board and connected by two cables with the lever of the carburetor forms the throttle control. The fiber friction washers loaded by means of a steel spring make the throttle lever stay put in any position on the graduated scale. The arrangement is such, that only the lever handle and the graduated housing project through the instrument board, the spring, washers and the attachments of the wires are hidden back of it.

Design of the Hull

The lines of the hull were drawn to obtain good seaworthiness and take off and easy landing. The seaworthiness depends primarily on the amount of the reserve buoyancy and plenty of this was provided. The lines are based in general on the successful lines of the model AMC hull with slight changes that were found in the light of experience advantageous and safe to adopt. Thus the "V" bottom is made sharper, the angle of the bottom on each side of the keel with the horizontal is 18 deg. at the step and 28 deg. half way from the step to the bow. Eighteen degrees angle is carried uniformly from the step to the stern. The straight lines of the keel and the chine in side elevation are carried farther forward, slightly over half way from the step to the bow. The tail portion of the hull has slight upward sweep to bring the tail surfaces farther from the water and to shorten the tail bracing. The curve of the rear keel starts at the step at an angle of 8 deg. to the front bottom.

The large reserve buoyancy and the upward sweep of the rear bottom resulted in rather short waterline, and as a sequence in wonderful maneuverability on the water. It appears that the minimum turning radius in taxiing is about equal to the span of the machine. The slight skidding during these turns was found to produce such reaction on the sharp V bottom, that the boat banks itself toward the center of the turn, rather than burries the outward wing tip float, as is the usual case with the flying boats.

The value of the sharp V bottom in absorbing the landing shocks is hardly disputed by anybody. However many people still hold the opinion that V bottom is detrimental to take off, and flat bottoms are often found on European Continental boats. The experience of this Company seems to indicate that the sharper V bottom is advantageous, if anything, and our most successful boats from the take-off point of view are found to have the sharpest V bottoms.* The main fault of the V bottoms, namely throwing of the solid water and spray high up on the sides of the hull, seems to be entirely cured by having sharper V at the bow and flatter one at the step. The observation of the take-offs of this boat showed that the water hardly ever rises above 18 or 20 in. on the sides, and the lower wing, however, low located, never gets the solid water and but little spray.

Structural Details of Hull

Structurally the hull is built up of 17s alloy sheets and stamped shapes. The framework consists of a number of frames and fore and aft stiffeners, so spaced as to give proper support to the sheet metal covering riveted to it. All the stiffeners and the frames in the cockpit are of the same size U-shaped section, while the frames in the inclosed compartments are made of Z sections. Four bulkheads divide the hull into four water-tight compartments, not counting the cockpit. Aluminum alloy tubes are installed for the passage of the control wires through these compartments without affecting their watertightness. The seats are built in the hull permanently, and allow the pilot and two passengers to sit comfortably. The pilot's seat is somewhat in front of the passengers' and particular care was exercised in arranging the seats and the controls so as to prevent them from being interfered with by the passengers.

A watertight tube is provided across the hull just in front of the step for the wheel axle to pass through. The attachment of the wheels greatly facilitates the handling of the boat on shore and prevents the damage often done in use of the handling trucks. For the test flights 3 men with the Ford car brought the machine out of the hangar some 400 ft. from the shore, launched the boat and took it back into the hangar after the flights. This was done on sandy beach without runway and in low tide.

The test flights, which commenced on June 28, 1924, immediately demonstrated the perfect balance of the boat not only in normal flight, but during take-off and in the glide as well. The boat was flown with the pilot and the fuel as the only load, with pilot and a passenger and with two passengers, and the balance was found satisfactory in all cases. Curiously enough the take-off and the flying qualities seemed to be but little affected by the amount of the load carried. In all cases the boat was on step in 4 to 5 sec. after the opening of the throttle, and was off from 15 sec. with lighter load to 20 sec. with three people aboard. Rather large size propeller was fitted, and the motor did not exceed 1390 r.p.m. at the maximum speed, what corresponds to 72.5 hp. according to the power curve supplied by the motor manufactures. The high speed determined by our conventional runs on the speed course was found to be 73.5 mi./hr. The speed at minimum throttle setting was found to be 40.5 mi./hr. with the tachometer showing 1010 r.p.m. These tests were made with two people aboard and with other loads as listed under "Light Disposable Load" in the specifications given above. As the motor is fitted with the exhaust pipe opening above the wing, the flying at so low throttle setting was comparatively noiseless and was novel and delightful experience. The test flights are still in progress at the time of writing this description, and no data regarding the climb are yet available.

*We will remember that similar conclusion was reached before by Commander Richardson as the result of his towing tank and practical experience.

France honors U. S. World Fliers at LeBourget. Lieut. Lowell Smith on upper step to left of M. Laurent Eynac, Under Secy. of State for Aviation; Lieut. Leigh Wade, center, and Lieut. Eric Nelson, extreme right. Note the British Army tropical "shorts."

A $6,000,000 Error in Air Service Costs

Correction Made by Assistant Secretary of War Davis in Letter to AVIATION

In the issue of AVIATION for April 28, 1924, we printed the following, which includes a table given by Gen. Mason A. Patrick to the Appropriations Committee:

"Taking the Army Air Service first, on page 903 of the hearings will be found the following figures:

COST OF ARMY AIR SERVICE, FISCAL YEAR 1922-23

From appropriation "Air Service Army"	$12,648,397.41
From appropriation, "Salaries, office of Chief of Air Service"	195,000.00
Signal Corps	162,000.00
Medical Department	87,749.18
Ordnance Department	507,894.00
Quartermaster Corps	4,041,938.00
Pay of the Army	10,459,715.00
Mileage of the Army	41,478.38
Total	$28,144,131.97

"The above sum does not include the cost of any of the Liberty engines, the DH4's, or other material, that had been bought out of war time funds. As an instance, there still remain 11,993 Liberty engines on hand out of war stocks, which are being used in new Army aircraft."

A request was made of Secretary Weeks for a statement of the complete cost. He replied that all the figures that were available were those given above, but that detailed figures would be sent AVIATION at a later date.

These figures have been received from Assistant Secretary of War Dwight F. Davis, with the following notation.

"The data contained in communication of June 14 was the best estimate at the time, but should now be replaced by the later and more accurate data for the same year contained herein.

The figure sent for the year 1923, as will be seen from the tables below, is $22,357,629.27 or a difference of $5,786,502.70 between General Patrick's Cost of Army Air Service for 1923," as given to Congress, and the revised figures.

This error is so glaring and inexcusable that AVIATION has requested a statement from Secretary Davis giving some explanation of how such mistakes can occur in Air Service figures.

Of greater importance are the tables sent with the letter and printed below. It is the first time that the public has been given the costs of our Army Air Service in tabular form. In fact, they have not been available in any form, so far as we know, up to this time.

The first table gives the cost of the Army Air Service for the fiscal years 1920-1924 inclusive. It will be seen that General Patrick gave the Quartermaster Corps cost as $4,041,938.00, whereas the later figure is only $502,066.74. How this could happen in any department of the government is difficult to understand.

Almost every other item in the 1923 figures has been revised. If these were for the fiscal year 1924, just closed, errors of

1. COST OF ARMY AIR SERVICE FOR THE FISCAL YEARS, 1920, 1921, 1922, 1923 AND 1924

From appropriation:	*F. Y. 1920*	*F. Y. 1921*	*F. Y. 1922*	*F. Y. 1923*	*F. Y. 1924*
Air Service, Army	$25,882,153.27	$32,332,907.07	$17,680,372.74	$12,648,357.41	$12,419,075.43
Salaries, Office of Chief of Air Service	....	....	374,650.49	218,949.15	214,047.50
Signal Corps	250,000.00	160,000.00	825,000.00	162,000.00	550,000.00
Medical Department	90,448.49	73,153.82	64,386.77	70,188.72	54,618.26
Ordnance Department	892,647.00	599,593.00	681,230.00	667,854.00	508,390.00
Quartermaster Corps	290,914.86	2,361,873.63	1,056,367.67	502,066.74	663,770.59
Chemical Warfare Service	161.40	3,720.74	4,061.02	8,604.00	5,866.82
Corps of Engineers	....	....	25,651.08	60,978.75	6,211.88
Pay of the Army	9,156,264.00	8,705,331.60	9,380,905.40	7,985,424.60	8,223,973.60
Mileage of the Army	174,737.00	75,251.00	48,337.00	33,206.00	41,528.00
Totals	$36,737,326.02	$44,311,830.86	$30,140,962.17	$22,357,629.37	$22,687,482.08

2. COST OF AIR SERVICE—FISCAL YEARS 1920 TO 1924 INCLUSIVE

Statement Showing How Money Was Spent—By Principal Items

	F. Y. 1920	*F. Y. 1921*	*F. Y. 1922*	*F. Y. 1923*	*F. Y. 1924*
Personnel, Officers					
Pay and allowances	$4,196,430.00	$4,151,460.00	$4,458,830.00	$4,008,403.00	$3,963,018.25
Mileage	175,737.00	171,224.29	125,696.20	131,657.87	118,307.78
Personnel, Enlisted					
Pay	4,959,834.00	4,553,871.60	4,922,075.40	3,977,021.60	4,264,335.60
Personnel, Civilian					
Pay and Expense	7,538,784.89	7,170,169.29	4,005,484.15	2,918,333.30	2,735,740.60
Flying Fields					
Construction and improvements	3,641,622.14	8,982,491.88	518,095.16	374,327.27	376,117.81
Cost of maintenance	132,922.36	158,466.10	1,284,303.84	373,629.25	578,147.63
Depots					
Construction and improvements	10,210.00	58,381.55	....	....	....
Maintenance	84,886.14	493,016.67	296,445.60	233,770.41	79,923.70
Equipment					
Development and test	125,625.00	73,037.00	94,028.00	88,559.00	71,969.00
Procurement for issue	7,732,377.27	9,943,104.74	6,887,356.90	4,624,572.12	4,467,732.01
Storage and issue	31,716.00	26,657.00	33,314.00	28,386.00	30,838.00
Supplies	1,014,696.29	1,197,818.07	527,396.82	727,359.15	867,071.18
Cost of Ammunition	541,133.00	430,470.00	508,010.00	521,865.00	385,944.00
Cost of furnishing and operating Radio Equipment	250,000.00	160,000.00	825,000.00	162,000.00	550,000.00
Transportation Air Service property, material, etc.	30,468.42	53,003.19	610,056.30	330,088.53	446,421.84
Cost of fuel, gasoline, oil, etc.	233,611.00	394,779.06	828,636.73	689,003.30	743,112.99
Experimental and Research work	4,544,185.60	5,958,002.90	4,192,263.78	3,161,760.97	2,927,160.72
Damage by aircraft	2,120.40	2,838.83	6,200.00	1,500.00	1,000.00
Bombing aircraft	....	....	....	....	76,253.41
Rentals	415,670.99	238,612.17	....	....	....
Surplus material, disposal of	1,075,295.52	94,426.52	17,769.29	5,392.60	4,387.56
Totals	$36,737,326.02	$44,311,830.86	$30,140,962.17	$22,357,629.37	$22,687,482.08

3. STATEMENT SHOWING AMOUNT SPENT ON AIRCRAFT IN FISCAL YEARS 1920 TO 1924, INCLUSIVE

	1924	*1923*	*1922*	*1921*	*1920*
Airplanes, New	$ 943,332.03	$ 541,722.02	$1,579,397.20	$4,234,219.42	$4,005,462.21
Airplanes, Remodelled	805,620.27	451,679.91	372,455.15	381,565.23	1,498,372.27
Engines, New	141,904.00	716,673.75	929,879.86	2,519,067.89	780,483.45
Engines, Remodelled	....	128,075.00	198,037.13	....	....
Spare parts and accessories	1,110,471.75	1,169,688.13	2,248,607.41	307,338.35	781,564.34
Airships	198,396.36	136,339.74	398,300.82	273,784.94	509,900.00
Balloons	31,529.83	19,161.00	6,400.00	103,465.36	....
Spare parts and accessories	129,006.82	182,402.46	95,087.07	396,269.42	182,648.54
Total	$3,360,261.08	$3,345,742.07	$5,828,164.64	$8,215,710.61	$7,758,430.81

this sort could be excused on the plea of incompleteness of data, but for the previous year no such explanation will hold.

For the first time also a "Statement Showing how Money Was Spent—by Principal Items" is made public. While this statement is an excellent start toward a more detailed analysis, such items as $4,467,732.01 for "Procurement for issue in 1924" should be itemized so that the aviation public will know how these large sums are being expended. The cost of "Experimental and Research Work" is given as $2,927,164.72.

A very natural question arises when the next table "Statement Showing Amount Spent on Aircraft in the Fiscal Years 1920 to 1924 inclusive" is examined. If these large sums are spent for "Experimental and Research Work," why did the results only make it worth while to spend $141,904.00 for new engines and $943,332.03 for new airplanes? If experimentation and research do not lead to the purchase of new and better equipment there is something radically wrong with the Air Service policy. It will be seen that $20,000,000 have been spent for experimental work in the last five years and yet only a little over a million dollars out of twenty-two million dollars were spent on new equipment.

While it is impossible to make more than a general analysis of the tables as presented in this form, it is a step in the direction of making available for public discussion the cost of our government aviation and the results we are securing.

Government Bids and Orders

Army Air Service Awards—Awards made by the chief of air service, U. S. Army, Washington, for miscellaneous supplies: Cir. CAS-130, June 10.

The Stover-Lang Co., Boston, 25 aircraft tachometers, $250 ea.

McCook Field No. 117, Bids and Award—Bids received June 17, cir. 117, by the engineering division air service, McCook Field, Dayton, Ohio, for 10 external bomb hoists:

G. Elias & Bro., Buffalo, N. Y., $525; 120 days.

International Tool Co., Dayton, Ohio, $862; 120 days.

Eberhart Steel Products Co., Buffalo, N. Y., $1,077.81; 6 months.

Curtiss Aeroplane & Motor Co., Inc., Garden City, N. Y., $678; 120 days.

Rock Island Arsenal, Ill., $230, 100 days, accepted.

McCook Field No. 127, Bids and Awards—Bids received June 26, cir. 127, by the engineering division, air service, McCook Field, Dayton, Ohio, for exhaust manifold installations:

Item 1a, 45 sets exhaust manifold installation, extended type, for DH4b airplanes; 1b, 60 sets do; 1c, 75 sets do; 1d, 90 sets do; 2a, 75 sets exhaust manifold installations for NSB1 airplanes; 2b, 100 sets do; 2c, 125 sets do; 2d, 150 sets do.

G. Elias & Bro., Buffalo, N. Y., item 1a, $58.50; 1b, $57.80; 1c, $57.40; 1d, $57.11; 2a, $28.57; 2b, $26.28; 2c, $24.90; 2d, $24; 120 days, 1½ per cent 10 days.

The Balyeat-Jenks Co., Cleveland, items 1a to d, $34.75, accepted, for 90; 2a to d, $24.25; 1 per cent 10 days; time 120 days.

Eberhart Steel Products Co., Buffalo, N. Y., item 1a, $179.60; 1b, $169.60; 1c, $159.60; 1d, $149.60; 2a, $91.65; 2b, $86.65; 2c, $81.65; 2d, $76.65; 6 months; 1 per cent 10 days.

Gallaudet Aircraft Corp., East Greenwich, R. I., item 1a, $52.50; 1b, $50; 1c, $49; 1d, $47.50; 2a, $55; 2b, $50; 2c, $47.50; 2d, $45; 1 per cent 10 days; time 120 days.

Curtiss Aeroplane & Motor Co., Inc., Garden City, N. Y., item 1a, 46; 1 b, $44.50; 1c, $43.50; 1d, $42.75; 2a, $30; 2b, $28.25; 2c, $27.75; 2d, $27.50; delivery 90 days.

McCook Field No. 126, Bids and Award—Bids received June 26, cir. 126, by the engineering division, air service, McCook Field, Dayton, Ohio, for 20 gem synchronizing systems with E3 generator complete:

City Machine & Tool Works, Dayton, Ohio, $640; 4 months.

Steel Products Engineering Co., Springfield, Ohio, $176; 90 days.

International Tool Co., Dayton, Ohio, $561.24, ½ per cent 10 days.

Universal Machinery Co., Baltimore, $152.50; 120 days.

Allison Engineering Co., Indianapolis, Ind., $170, 1 per cent 10 days, time 60 days, accepted.

McCook Field No. 124, Bids and Awards—Bids received June 24, cir. 124, by the engineering division, air service, McCook Field, Dayton, Ohio, for supercharger parts:

Item 1, 15 air inlet manifolds; 2, 15 air inlet elbows; 3, 15 air coolers; 4, 45 air cooler gaskets; 5, 15 supercharger support brackets; 6, 15 do.

Eberhart Steel Products Co., Buffalo, N. Y., item 1, $100.92, accepted; 2, $40.69; 3, $225.50; 4, 86c, accepted; 5, $20.56; 6, $20.56; delivery 5 months, 1 per cent 10 days.

Curtiss Aeroplane & Motor Co., Inc., Garden City, N. Y., item 2, $14.66, accepted; 3, $146, accepted; 5, $8, accepted; 6, $8, accepted; delivery 75 days.

Gallaudet Aircraft Co., East Greenwich, R. I., total all items, $7,275, 120 days, 1 per cent 10 days.

American World Flight

The three American world fliers who arrived at Brough, England, on July 17, changed their motors, substituted pontoons for their wheels and put on new wings. Incidentally the aviators got a much needed rest. The work was done at the shops of the Blackburn Aviation Co. and the manner in which the Americans worked won the admiration of Britishers.

In the meanwhile the scouting fleet of the U. S. Navy, under command of Admiral Magruder, was being placed in position to patrol the course of the fliers. The present plan of cooperation provides that there will be at least four vessels on every flight over the water, while on the longest flight, from Ivigtut to Indian Harbor, Labrador, there will be at least seven vessels at intervals across the Davis Straits.

On July 30 the fliers left Brough and covered the 370 mi. to Kirkwall in 5 hr. 30 min. Lieutenant Smith had considerable difficulty "unsticking" from the very glassy water, but otherwise the trip was uneventful except for fog which was encountered at one or two points. On Aug. 2 the fliers, who had laid over for a day on account of fog, started off but soon ran into a heavy fog bank and became separated. Lieutenants Smith and Wade returned to Kirkwall, but Nelson pushed on to Hornafjord, Iceland, after flying through several very heavy cloud banks. He was in the air 8 hr. 19 min. covering the 645 mi.

On Aug. 3 Smith and Wade started out again in spite of unfavorable weather reports. Lieutenant Smith reached Iceland, but Lieutenant Wade had motor trouble off the Faroe Islands and was forced down, damaging his wings slightly in the heavy sea. He floated around for four hours after which he was taken in tow by a British trawler, and later by the U. S. destroyer Billingsley. The U. S. cruiser Richmond came up shortly and tried to lift the plane Boston on board, but with disastrous results, for the crane broke and fell on the plane, damaging it so severely that Wade's ship is considered as out of the running.

British World Flight

The British World Fliers, who had been forced down by fog on the South West shore of Uruppu Island on July 16, were delayed by bad weather until July 23 when they flew on to Murakami Bay, Paramashuri Island, Kuriles. On the next day they proceeded to Petropavlovsk, Kamchatka. Here they were again weather bound until Aug. 1 when they flew to West Kamchatka. On the following day they went to Nikolski, Komandorski Island but a meager report from the U. S. Coast Guard Cutter Algonquin says that the plane had met with an accident but that none of the fliers were hurt.

Argentine Flier Starts World Tour

Maj. Pedro Zanni, the Argentine aviator, left Amsterdam, Holland, on July 22 in a Fokker plane in an attempt to fly around the world. He expects to follow the same route as Major Maclaren, the British World flier. On Aug. 1 he had reached Bendar Abbas, Persia.

The 15th Anniversary of Our Air Service

On July 30, 1909, the Army Accepted the First Military Airplane

By ERNEST L. JONES

Fifteen years ago the United States inaugurated its air service with 1 plane, 1 airship and 2 balloons. The longest airplane flight was an hour and the speed 42 mi.

This is an anniversary year. AVIATION *recalls the great exploits of a decade and a half ago, brings to mind forgotten lore and adds some long-buried facts of interest.*—EDITOR.

(Continued from last week)

Wilbur Wright departed for France where on Aug. 8, 1908, he began flights preparatory to delivery to the French syndicate which had purchased the patent rights—the first flights of an American in Europe. By the end of the year he had outflown every European competitor.

Just after the Baldwin airship, the American government's first power balloon, had been accepted after being put through its paces by the late "Uncle Tom" Baldwin and Glenn Curtiss, Orville Wright arrived at Fort Myer, across the Potomac from the Capital.

He began flying on Sept. 3 and within a few days had broken all flight records. He was the first man in the world to fly an hour. On Sept. 9 he took up Lieut. Frank P. Lahm, the first American Army officer to fly. A few days later he took Maj. George O. Squier for a new world two-man record of 9 min. 6 sec.

Flights continued until Sept. 17 when Lieut. Thomas E. Selfridge, First Field Artillery, was given a ride. After a few rounds of the course a propeller blade was seen to fall, the machine was put into a glide but loss of control resulted and Lieutenant Selfridge died two hours later from his injuries—the first death in power flight. Mr. Wright himself suffered injuries and the trials were postponed until the following year.

The Final Delivery

On July 30, 1909, Orville Wright and First Lieut. Benjamin D. Foulois completed at Fort Myer, the second and final official trial flight of the Wright airplane—a cross country trip of 5 mi. in each direction, with and against the wind. The speed attained was 42 mi./hr., which won a bonus of $5,000 over the contract price of $25,000. A few days before, the endurance requirement had been exceeded by a flight of 1 hr. 12 min. 40 sec., with First Lieut. Frank P. Lahm as a passenger.

The Board of officers appointed to conduct the tests consisted of: Maj. George O. Squier, Maj. C. McK. Saltzman, Capt. Chas. S. Wallace, Capt. C. DeF. Chandler, 1st Lieut. Frank P. Lahm, 1st Lieut. B. D. Foulois and 2d. Lieut. Frederic Humphreys. Lieut. George C. Sweet of the Navy also served with the board.

The board for 1908 included: Squier, Saltzman, Wallace, Lahm, Foulois and Selfridge.

After the delivery of the Army airplane on July 30, 1909, payment of the $30,000 was made from the funds of the Board of Ordnance and Fortifications, the same organization which supplied the $50,000 for the Langley experiments; and Orville Wright left for Germany where a company had been formed similar to that in France and England. Wilbur remained in the United States to teach the first army aviators—Lieutenants Lahm, Foulois and Humphreys. The two former completed their course; Humphreys was relieved without finishing and subsequently entered civilian life.

And so it came about that Uncle Sam got his air service—3 officers and 10 enlisted men assigned to aeronautical duty within the Signal Corps. In materiel, he had 1 airplane, a year-old airship, a hydrogen plant and a 200 ft. balloon and airship shed at Fort Omaha, a small captive and one free balloon.

How Uncle was pushed into the air game is another story.

Lack of Interest

The honor of being the first world power to have the nucleus of a flying fleet was hardly the result of premeditated sagacity, however, as will appear. America has been first in the air on numerous occasions but as to subsequent development, Uncle Sam's motto is "Laissez faire à George."

But the story of America in the air is the story of the Wright Brothers, and the fifteenth anniversary of the inception of the world's first flying force is likewise the anniversary of the triumphs of Orville and Wilbur.

In January, 1904, the American daily papers carried a statement from the Wrights of their successful first flights of Dec. 17, 1903—the first power flights by man. But no one seemed to believe.

In the same year, the Wrights caused a proposition to be placed before this government, offering the whole works for $100,000—their tables and figures, the proposed patent, and a real, live airplane, the only one in captivity—all dependent on the Wrights actually demonstrating that it could fulfill requirements actually the same as those under which the government finally did acquire the machine alone in 1909.

Here was America's opportunity to give the "secret of flight" to the world.

The suggestion was turned over to the Board of Ordnance and Fortifications, which replied in doubting phrases and added that, anyway, it had not that much money to spare for the purpose.

Enthusiam Abroad

The publication, in 1905, in a foreign aeronautical journal, *l'Aerophile*, of an account of the Wrights' flights from 1903 to 1905 aroused no official enthusiasm in the War Department, though it caused a big sensation in Europe and started renewed experimentation.

Even Simon Newcomb, an eminent physicist, said in 1901 that the construction of an aerial vehicle that would carry even a single man would require "the discovery of some new metal or some new force."

Nor did the American Aero Club's 1906 announcement, after investigation and interviewing witnesses of the Dayton flights, inspire any official action by our government.

The French authorities, however, were keen and sent over a Major Bonel, who visited Dayton in 1906 and satisfied himself of the truth of the Wrights' statements.

Neither was Germany blind to the airplane, for in October, 1906, Captain Hildebrant, a famous student of aeronautics and an author of works on the subject, investigated the Wrights. He, too, talked with witnesses of the later flights of 1904 and 1905 made in the presence of Dayton citizens and he proclaimed that "the age of the dirigible balloon has been broken."

He expressed the opinion, in view of the secrecy maintained by the Wrights, that the machine itself must be so simple that a purchaser could not be found at the price asked were it exhibited.

"Furthermore," he said, "I am inclined to think it requires great skill to handle the machine. • • • I am of the firm belief that a sum as high as 4,000,000 marks will not be required if we entrust German engineers and aeronauts • • • with the solution of this problem. Surely we will not have to be behind the American inventors."

Neither Bonel nor Hildebrant saw the machine.

These visits were noticed, however, by an American citizen in private life, and in the course of time, and as a result of his interest, the Board of Ordnance and Fortification did again address a letter to the Wrights asking them to submit another proposition.

The Wrights reiterated their willingness to deliver a machine, which would do certain things, for $100,000.

But nothing eventuated.

This antipathy toward the airplane by the Board of Ordnance and Fortification may be partially excusable. It was not so long before that it and the War Department had been bitterly attacked in Congress for spending money on Langley's flying machine when Professor Langley was characterized as "a professor wandering in his dreams" and the officials permitting the expenditures as "hypnotized."

A group of aero enthusiasts in New York approached the Wrights in 1906 and proposed to buy the patent but the necessary funds failed to materialize.

So it came to pass in the Winter of 1906 that negotiations were inaugurated for the sale of the Wright machine and patent to various foreign governments and syndicates; and various curious stories were printed as to alleged demands, prices wanted, conditions, and so on, of the Wrights. As is well known, these efforts eventually met with success. In at least one of these, Hart O. Berg, who also introduced the Lake submarine to Russia, was instrumental.

Foreign Interest Alarms War Department

It would appear that our military attaches abroad were attracted by these operations, for in 1907 the War Department suddenly evinced a real interest and this time opened communications itself, upon the return from abroad of Maj. George O. Squier, who had been visiting the air centers of Europe where there was great activity in free and power ballooning.

Orville Wright told the writer that, when they first broached the matter to the government, money was not the whole of the question and that, despite the bareness of the Ordnance and Fortification cupboard, he was sure satisfactory terms could have been made.

When the early proposals had been made to the government and to the Aero Club of America that for $100,000 patent applications would be dropped and the world could have the invention as a gift, the Wrights had in mind the trials and tribulations of patent litigation, did not want patents and were modestly willing to be satisfied if they could reap some fair return on their investment of brains, time and money.

But the legal experiences they later encountered were sufficient to make the Wrights determined in the end to enjoy the fruits of their labor, if at all possible. They proposed, also, to "bring out the results of their investigations in a scientific work upon the principles of aerial navigation." But this promise has never been fulfilled. We still await the Wright memoirs which should disclose absorbing tales yet untold.

They finally concluded negotiations in England, France, Germany, Italy and America, but they were not to avoid the hated lawsuits in any land but Italy and Wilbur Wright died on May 30, 1912, while litigation was in full swing.

Patent Office Skeptical

One can easily doubt any slight consolation there may have been for the Wrights in their success in getting the United States Patent Office to recognize them.

The Wrights had been able to convince the examiners that a dynamic flying machine was actually a possibility and obtained a reversal of the opinion theretofore held by the patent office which, as late as 1900, entered on the applications of other inventors:

"The construction is regarded as inoperative for the purpose intended. * * * Even if the rising could be successfully accomplished, the vessel would be uncontrollable through inability to maintain its normal position or balance. * * * Actual demonstration of operativeness will be required before the grant of a patent."

In the Fall of 1907, after the foreign negotiations had met with success, the foreign attaches had reported and Major Squire had returned, the Wrights came back to America to build machines with which to demonstrate their claims—abroad.

Wilbur stopped off at Washington and as a result of his interview with General Allen, the Signal Corps asked for bids.

The Air World in 1907-8

The year 1907 was an important one in the history of American aeronautics.

The world had finally accepted as true the 1903-1905 flights of the Wrights, and Farman, Delagrange, Bleriot, Pelterie and others were making short hops in France, and the Wrights had arranged for the disposition of their invention in foreign countries. Scores in every principal land were building gasless flying machines of every conceivable description, of which few ever flew.

In America, Gen. James Allen, Chief Signal Officer, created

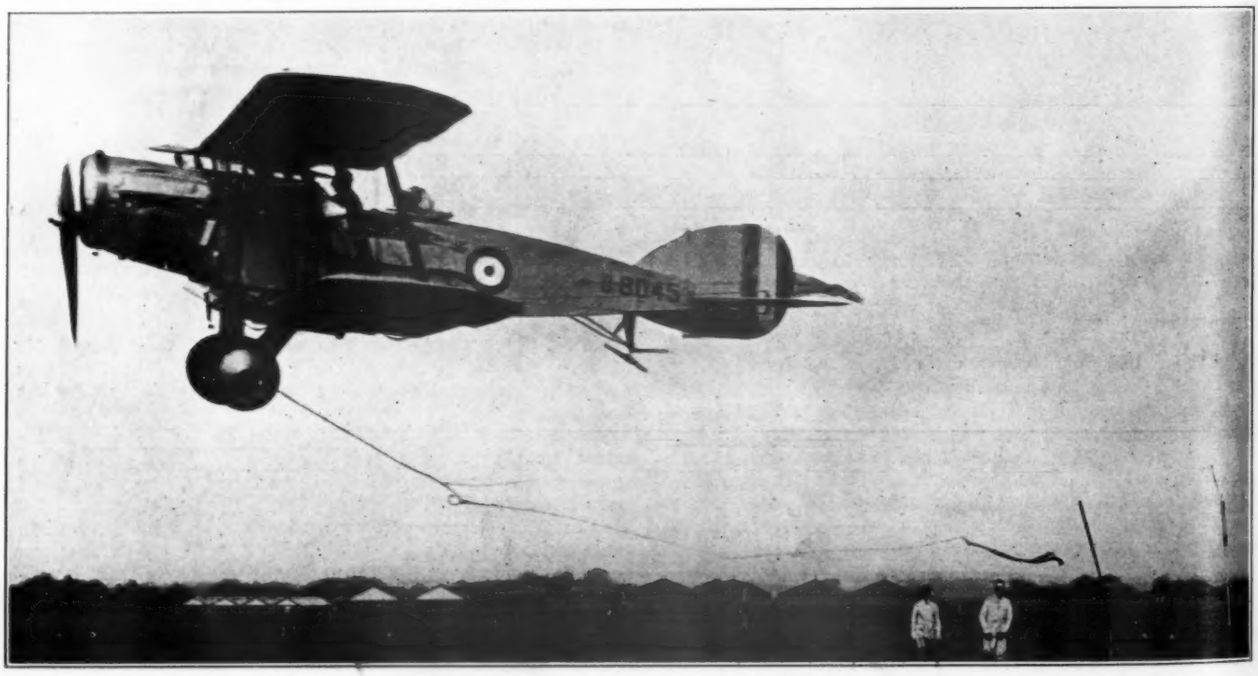


Photo Kadel & Herbert

Speeding up communications by picking up message bags from the ground—An interesting demonstration given at the Royal Air Force Pageant in London

on July 1 the Aeronautical Division of the office of the C.S.O., and the first step taken was the detail of Lieut. Thomas E. Selfridge to the home of Dr. Alexander Graham Bell, in Nova Scotia, to see what Bell was doing in the air. General Allen had announced a plan of providing an airdrome in the East which experimenters could use for their trials and had called for bids on an airship and a flying machine.

Aero clubs were being rapidly established in the United States, more than a dozen small airships were being flown at fairs about the country, the Aero Club of America had held its third exhibition and Jamestown Exposition had built a special building for aircraft—the first of its kind in the history of such affairs. The second Gordon Bennett balloon race was held at St. Louis.

Wellman was starting for the Pole by airship, Dr. Bell and Israel Ludlow were flying man-carrying kites, sport ballooning was popular and Lawrence Lesh was towed 6 mi. in a slider over the St. Lawrence. In the Winter Dr. Bell, Lieutenant Selfridge, Glenn Curtiss, F. W. "Casey" Baldwin and J. A. D. McCurdy organized themselves into the Aerial Experiment Association for the purpose of building an airplane that would fly and construction work was inaugurated on gliders and a full sized machine in the Curtiss motorcycle plant at Hammondsport, N. Y.

No hops anywhere in the world in 1907 began to approach the flights up to 24 mi. of the Wrights made during 1904-5. Until the short jumps of Santos Dumont and Vuia in 1906; of Delagrange, Bleriot, Farman and Pelterie in 1907, none over 2000 ft., the world had heard of no flights other than those of the Wrights.

The Year 1908

The two great events of 1908 were the May series of flights by the Wrights in secret at Kitty Hawk preparatory to delivering their airplanes to the world powers and the public flights of Wilbur Wright in Europe and of Orville Wright in America.

Ballooning continued popular and ten new aero clubs made a total of 19. A. C. Triaca established a school of aeronautics in New York, and the government, of course, opened its bids for the first government airship and the first government airplane.

The Aerial Experiment Association was successful with its first machine, the "Red Wing," which flew some 319 ft. In rapid succession came three more of the A.E.A. machines, each more successful than its predecessor. The "June Bug" won the *Scientific American* trophy for the first official public flight of a kilometer at Hammondsport on July 4, flown by Glenn Curtiss. In December the "Silver Dart," the fourth machine, began flying. The old "June Bug" was fitted with pontoons and inaugurated the development of water flying in America. The work of the organization having been considered accomplished, it was disbanded early the following year.

The Army airship had been delivered and there had been bought a free and a captive balloon. The hydrogen plant, shed and gasometer at Fort Omaha were about finished and the Signal Corps made a number of ascents during the year with the "Signal Corps No. 1," our baby airship, and with the sphericals. In one of these the first radio messages were received in a free balloon. M. O. Anthony of New York demonstrated the starting, steering and stopping of an airship by means of radio, the feat being duplicated by McCook Field in 1924.

During the year there were conducted national balloon races at St. Paul, Minn., Columbus, Ohio, and Chicago and America was represented in the third Gordon Bennett at Berlin.

In the Summer Roy Knabenshue began the movement for larger airships and constructed a silk 3-passenger craft and the National Airship Company of Berkeley, Calif., put into the air a monster 485,000-ft. coal gas dirigible "Ariel" which collapsed a short distance from the ground.

Kissimmee, Fla., passed the first and famous aircraft ordinance and baby airships were continuing their stunts over the tents of the local fairs.

The 1924 idea of the low-priced, low-powered airplane was broached by the flights of Matthew B. Sellers, of Fireclay, Ky., in a miniature quadroplane; and J. Newton Williams and Wilbur R. Kimball finished their helicopters.

Newspapers put aeronautics on the front page and the Philadelphia *Inquirer* started the first air column.

In the Spring Frank E. Boland was completing his first airplane, with which was laid the foundation of the present Aeromarine company. For the benefit of men like Boland, the active members of the Aero Club of America endeavored unsuccessfully to get the club interested in aviation and to provide a flying field. As a result of these abortive efforts, the Aeronautic Society was formed which leased the old Morris Park racetrack and gave an outdoor exhibition, after failing to complete arrangements to have Delagrange come to this country to fly, for until the Army trials in September the only persons who had ever seen flights in America were the neighbors of the Wrights at Kitty Hawk and in Dayton in 1904-5, the newspaper correspondents who sneaked up on the Wrights at Kitty Hawk in 1908, and visitors to the Hammondsport flights of the A.E.A.

The Aero Club of America subsequently sponsored the trip of Henry Farman to this country, who made a few hops the length of the Brighton Beach track the end of July.

The United States stood at the foot of the list of the world powers in air strength, with its 3 officers and 10 men. Russia headed the list with 79 officers and 3255 men in aeronautics.

The flights of Wilbur Wright in Europe and of Orville in America had overshadowed the flights of all other pilots of the world at the end of the year and the two brothers had exceeded all their previous performances. General Allen was pressing unsuccessfully for an aeronautic appropriation and every country in the world was feverishly attempting to get in the air with the airplane.

American Aircraft Exports

The Department of Commerce reports the following domestic exports of aircraft, engines and parts from the United States during May, 1924:

	Airplanes and seaplanes		*Parts of except engines and tires*		*Aircraft engines*	
Countries	*Number*	*Dollars*	*Pounds*	*Dollars*	*Number*	*Dollars*
Italy	–	—	34	299	—	—
Netherlands	–	—	—	—	17	21,800
Canada	–	—	3,075	4,775	5	8,000
Honduras	–	—	5	40	—	—
Mexico	1	7,500	20,556	36,352	—	—
Cuba	–	—	346	190	—	—
Argentina	–	—	32	36	—	—
Brazil	–	—	2,314	4,235	—	—
China	–	—	375	240	—	—
Total	1	$7,500	26,737	$46,167	22	$29,800

J. H. Vickers Joins Curtiss Staff

J. H. Vickers has associated himself with the Curtiss Co. in connection with the production and operation of military aircraft.

It is believed that the wide experience of Mr. Vickers will prove of great value not only to the company but to the development of military and naval aeronautics in this country. He was graduated from Cornell University in January, 1917, and after some industrial experience with the DuPonts in the production of nitro-cellulose products, he joined the American Ambulance with the French Army at Verdun and later became the buyer for American aviation material in Paris.

In 1918 he was in the Ypres Salient as a corps observer with the R.A.F. He learned to fly at this time and was stationed with the Squadron on the Rhine after the Armistice. During the last five years his work has extended pretty well throughout Asia, flying in 1919 in Mesopotamia, Persia and Khurdistan, acting as officer in charge of engine repairs of the Sixth Squadron at Bagdad; in 1920 he passed A-2 in the Instructors' Course in acrobatics in Egypt and later became Egypt Group Transport Officer at El Maza and Flying and Transport Officer at Heliopolis; in 1921 he was flying with the Fourteenth and Two Hundred and Eighth Squadrons in Palestine and Trans-Jordania. During this time he laid out the landing grounds for the Cairo-Bagdad Aerial Mail Route at Kantara, Romani, Mossefig, Kilo 143 and El Arish, on the Sinai Peninsula. In 1922-1923 he was an instructor in aerial gunnery and camera gun operation at Eastchurch.

Loening Amphibian Planes Ordered

Maj. Gen. Mason M. Patrick, Chief of the Army Air Service, announced on July 23 that a contract had been placed with the Loening Aeronautical Engineering Corporation of New York for the construction of a group of ten amphibian planes from designs of Grover C. Loening. The development and flight testing work on the first of these planes has been conducted for the past few weeks in secret.

The Air Service officials say that the reports of test pilots and engineering officers show this new plane to possess remarkable and useful characteristics. The design represents the first successful tractor flying boat that is completely amphibious, operating on land and water. Its performance has been found by tests to compare favorably in climbing and maneuverability with land type airplanes of equal weight and power. A speed of about 120 mi/hr. has been attained.

The hull of the Loening amphibian airplane is duralumin-covered throughout, and the construction of the wings is also largely duralumin, including the ribs and struts. Among the interesting features of the design is the use of the inverted Liberty motor. which has been successfully developed by the Government in cooperation with the contractor.

Final test flights of the first of the type to be constructed were made on June 10. The plane rose from the East River and flew to the Army Air station at Mitchel Field, L. I., landing there on land twelve minutes after leaving the East River. In one day, the plane made twenty to thirty landings, half of them on water and the balance on land.

The retractable landing gear is folded underneath and at the side of the hull, and is controlled by pressing a button on the pilot's dashboard. This operates an electric motor, driven by a storage battery, which releases the landing gear in eleven seconds.

By the installation of the inverted Liberty engine the position of the propeller hub is at the top instead of the bottom of the engine. As a result the engine operates much better and the oiling system is greatly simplified. This position of the engine is much simpler to install and the connections are much shorter than when the engine is in its normal position.

The machine is equipped with dual controls and the observer has three positions. One is at the bottom of the fuselage for use in photographing, the second is in an intermediate position where he can operate the controls and the third is on the gun platform where mountings for machine guns can be installed.

The Modified Winslow Bill

In our issue of Jan. 15 and Jan. 29, 1923, we published abstracts and comments on the Winslow Bill. The bill was passed on to a sub-committee of the Committee on Interstate and Foreign Commerce. The sub-committee which issued a report on April 11, 1924, has made certain changes which it puts forth for the consideration of the main committee, but, "they are not to be considered as having been either approved or disapproved by the subcommittee."

Two main changes, or rather omissions, are suggested. One is the elimination of the parts of section 31 which allows the Commissioner of Civil Aeronautics to establish, repair and operate air navigation facilities. According to the suggested alteration, he would be limited to operating aerial lighthouses and signal stations and radio directional finding and radio communication facilities. He is further authorized to chart air routes and to publish maps, but is instructed to utilize the existing government facilities as far as possible.

The Civil Aeronautics Consulting Board, which was to consist of seven members to serve without pay and whose duty it was to establish and maintain liaison between the bureau and the civil aeronautic industry of the United States, has also been eliminated.

Further alterations are the fixing of the salary of the Secretary, his assistant and the three attorneys in accordance with the classification act of 1923. A clause is added which specifically states that there shall be no research or experimental work done by the Bureau unless no other bureau is authorized to do such work . Publication of information as to standards of design, repair, etc., is modified to apply only where it will facilitate compliance with the act.

The sub-committee has prepared a summary of the purposes of the bill with the hope that it will assist those who wish to make suggestions to the Committee when the hearings are held next fall. Copies of the bill can be obtained by addressing a request to Elton J. Layton, clerk of the Committee on Interstate and Foreign Commerce, Washington, D. C.

Should the bill be passed in the next session of Congress it would do excellent work in defining the legal status of aircraft. The sections applying to liability for the delivery of goods, the defining of requirements for flights to foreign countries, the sovereignty of the air space of the United States, the application of existing laws to air navigation, etc. are all most necessary and will do much good in putting aviation on a sound basis as an established industry. However the parts which really interest the commercial flier of today, that is the sections concerning registration and licensing of planes and pilots, are purposely and necessarily left vague and undefined. Once the bill is passed, the real work of the bureau will have just begun. The Commissioner will have to work out the kind of inspection which is necessary and, as far as the bill goes, he has complete discretion as to whether it shall be a mere formal registration of aircraft and pilots or whether it shall be a real periodical examination of the machine based on its theoretical engineering safety factor and on its actual condition at the time. There will probably be a gradual working out of the problems.

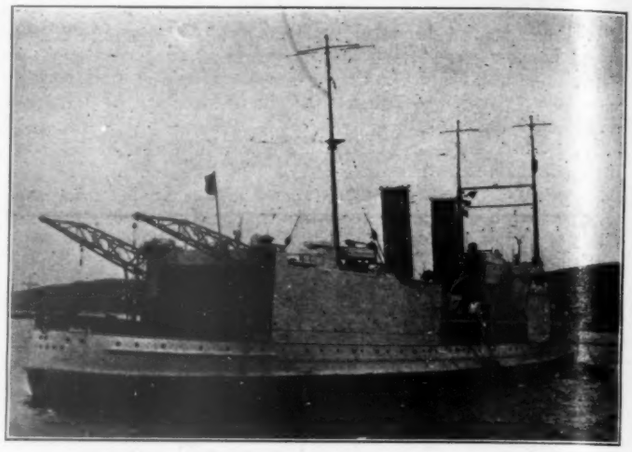


Photo International

A new British aircraft tender, H.M.S. Pegasus, which has been assigned to the naval station at Singapore

There is no indication as to what the mechanism will be for the granting of licenses, whether existing state agencies will be used or whether a new organization of aeronautical experts will be built up. The bill provides for an appropriation of $375,000.00 for expenses incurred prior to July, 1926, so that there should be funds available for providing convenient facilities for inspecting and obtaining licenses without putting a serious burden of time wasted or money to be spent on the small operator or private owner.

The fines which can be imposed for violation of the regulations are very severe and categoric in their nature. There is much work still to be done and it is to be hoped that it will be done by men who are themselves fliers and who have an understanding of commercial aviation as it exists today in the United States.

President Appoints New Member N.A.C.A.

Announcement is made that President Coolidge has appointed Maj. John F. Curry a member of the National Advisory Committee for Aeronautics to succeed Maj. Lawrence W. McIntosh, of the Army Air Service. It is stated that this change is made because Major Curry has succeeded Major McIntosh as Chief of the Engineering Division of the Army Air Service and Commanding Officer of McCook Field, Dayton, Ohio.

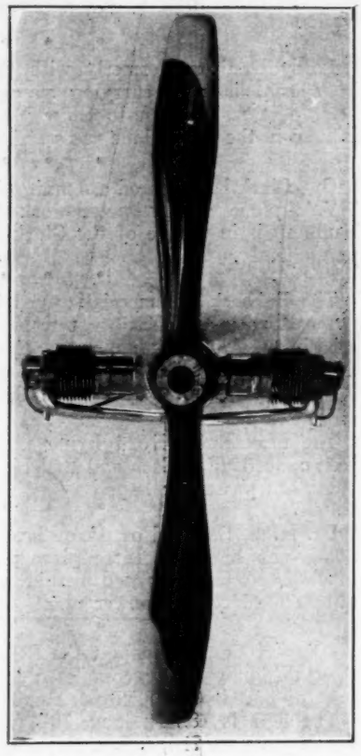
LIGHT PLANES AND GLIDERS

Edited by Edmund T. Allen

The Bates Light Plane Motor

The Bates Engineering Company of Chicago has just announced a new light plane motor of 77 cu. in. displacement. It was designed to compete in the Dayton Races where the engine size is limited to 80 cu. in.

The cut shows the clean design and size in proportion to the propeller which is designed for light planes. Other than the intake manifold, the cylinders themselves are the only parts projected into the resistance area. The cam and rocker arm arrangement together with the magneto are placed behind the crankcase, and the carburetor projects only very slightly from the sump. From the point of view of minimum projected area, the Bates engine is very pleasing.



The Bates 77 cu. in. two-cylinder horizontal opposed engine for light planes

The crankcase is made of aluminum alloy, the pistons of Magnalite, the cylinders of cast iron, and the crankshaft and connecting rods of chrome-vanadium steel forgings. The engine is lubricated by force feed oil pump, with an oil cooling device incorporated in the sump. The weight of the engine is 49 lb., which with its rated power (26 hp.) gives a weight-power factor that is surprisingly good.

Light plane enthusiasts will be interested in following any service tests which this engine will be given. If it stands up well, the manufacturers will, according to indications, receive plenty of orders.

Current Comments

This is the third light plane engine that has been announced in this country. The first, designed by Mr. Moorehouse, and built by the Steel Products Engineering Company of Springfield, Ohio, has apparently been consigned to the museum where it will be found ten years from now, and built as one of the best engines of that day. At present one cannot obtain a word from those who control it regarding possible production.

* * *

Those who are looking for a regular motorcycle engine for light plane installation will find the makers of the Indian engine ready to talk business. Two years ago the Hendee Manufacturing Company would have nothing to do with anyone who considered putting an Indian Engine in a light plane. Today they are supplying engines to the Huff-Daland Company for installation in the new Huff light plane.

American light planes are beginning to appear as finished products during this month. The low wing monoplane designed and built by Harvey Mummert of the Curtiss Company, was recently tested on Long Island. The Huff-Daland Indian engined light plane is now ready for test flights at the plant at Ogdensburg, N Y. The A4, described in these columns, is awaiting a new propeller in Washington. Two new machines are nearing completion at Dayton, Ohio. The Columbia Aircraft Company announces a Bellanca Sport two-seater light plane with a 30 cu in. motor.

* * *

In addition to these machines there are many in course of construction throughout the country. The National Advisory Committee for Aeronautics has been deluged with requests for the report of light planes of the British Competition which the Committee published recently. Many of the requests state that the writers are building light planes. Some wish to have an aeronautical engineer check their designs for strength and stability. Unfortunately for the designers, the Committee is not equipped to furnish such service and in many cases the amateur builders cannot afford to pay for the services of a consultant. Aircraft Companies are in a favorable position in this regard, as also in their lower cost of production. Most of the machines which have appeared thus far, however, are the products of private engineers, who have put all their spare time and funds into the development of the low-powered machine.

* * *

The Mummert machine which appeared a few weeks ago is the third light plane designed by Mr. Mummert since the end of the war. The first one was a little biplane reminiscent of the first Navy Racer, with the design of which, we believe, Mr. Mummert had a great deal to do. It was equipped with a 28 hp. Lawrance two cylinder "Penguin" engine, and had a speed of something like 100 mi./hr. or more. The second Mummert light plane was a "high wing" full cantilever monoplane with a Harley 74 cu. in. engine. The weight empty of this ship was 400 lb., causing with its small wing area, a landing speed of about 50 mi./hr. The high speed was about 90 mi./hr.

The third design was aimed directly at the speed races scheduled for Dayton in October. The big Harley engine was used with a direct driven propeller. The low wing cantilever monoplane type was adopted, and an aspect ratio of between 3 and 4 was chosen, with its favorable reduction in structural weight. Difficulty was encountered in getting off with the small high speed propeller and low aspect ratio. A chain drive reduction was substituted, and the machine got off very well and climbed slowly to 2500 ft.

This machine will be a strong contender for the light plane race and for the Rickenbacker Trophy.

Elements of the Wing Section Theory and of the Wing Theory

Report No. 191 of the National Advisory Committee for Aeronautics by Max M. Munk contains those results of the theory of wings and of wing sections which are of immediate practical value. They are proven and demonstrated by the use of the simple conceptions of "kinetic energy" and "momentum" only, familiar to every engineer; and not by introducing "isogonal transformations" and "vortices," which latter mathematical methods are not essential to the theory and better are used only in papers intended for mathematicians and special experts.

A copy of Report No. 191 may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

AIRPORTS AND AIRWAYS

Further Details of Bartlesville Meet

As announced in our previous issue the Bartlesville, Okla., Aero Exposition will be held on Sept. 1 and 2 with a total of $2,500.00 in prizes for the various events. Free gasoline and oil will be furnished the contestants and those desiring to do so will have the privilege of carrying passengers. The events scheduled and prizes are:

On to Bartlesville race, first prize, $500.00, total prizes, $850.00; 90 hp. race, first prize, $500, and other cash prizes; two seater race, first prize, $250.00, and other cash prizes, and to the best stunt flier a first prize of $250.00. Cash prizes will also be given for most accurate dead stick landing and for the highest parachute jump, and a loving cup to the winner of the military race.

The Bartlesville Aero Exposition, Inc., was formed for the sole purpose of stimulating and encouraging commercial aviation and is a non-profit organization composed of the leading business and professional men of Bartlesville. This organization has the endorsement and support of the Bartlesville Chamber of Commerce and will bear the strictest investigation.

Contestants and visiting aviators, upon arrival in Bartlesville, will be required to register with the manager of the meet, Billy Parker, in order that they may be entitled to the privileges of the field, free gasoline and oil and be made thoroughly conversant with the rules of the meet.

The field lies one mile directly west from the main part of the city of Bartlesville, and is plainly marked with a large circle on the hangar roof. The main runway lies north and south and is very easily picked out from the air. The hangar is in the southeast corner of the field.

The "On to Bartlesville" race for which $850.00 in prizes has been offered, will be judged by points, and consequently needs some explanation. This race is open to all civilian pilots and may be run on any of three days—Aug. 30, Aug. 31, or Sept. 1, 1924. It must be completed before midnight, Sept. 1, 1924.

Average speed will be determined by dividing the air distance between points of departure and the flying field at Bartlesville, Okla., by the total elapsed time. No points will be awarded for speeds of less than 50 mi./hr. The minimum number of points to be awarded on average speed per hour is 100. A plane making a speed of 150 mi./hr. will be awarded 100 points, and for each mile per hour less than 150 mi./hr., one point less will be awarded.

In order that pilots flying from distances greater than 500 mi. may not be penalized by having to land and take on extra fuel with the resultant reduction in average speed, based on elapsed time, the following points will be awarded on airline distance covered:

Planes starting at a point 300 mi. from Bartlesville will be awarded no points.

Planes will be awarded 10 points for each additional 100 mi. If the distance covered by a contestant falls between two of the recognized distances, he shall be allotted the distance nearest to which his actual flying distance falls.

Planes will be awarded 20 points for each passenger carried.

A minimum of 200 points will be awarded to the plane completing the flight propelled by an engine of 30 hp. or less. For every 10 additional horsepower 5 points less than the maximum will be awarded. No claim will be allowed against loss of power, poor fuel, etc. This event is open to any type of aircraft with 400 hp. or less. (Civilian planes only.)

Contestants must secure an affidavit signed by two responsible business men, at point of start, stating actual time race was started and number of passengers in machine.

Further details and entry blanks may be obtained from Billy Parker, the General Manager.

Akron News

Enthusiastic efforts on the part of a small group of men and women interested in aviation here may bring Akron its sought after Air Mail field, it is believed, and may hasten the selection of a site for the proposed municipal flying field.

Representatives of the Akron Chamber of Commerce, Fred Smith, owner of Stow Field, and others who are concerned with making Akron prominent on the air maps of the country, think that a decision with relation to the Air Mail depot will likely be reached by authorities within the next few weeks.

* * *

Larry Danison, formerly with the Babcock Airplane Co. in Akron, is now carrying passengers from a Cleveland field. He will return to Stow Field this fall and may be entered in the light plane races at Dayton in October.

* * *

Gus Clark has secured a Jennie which will be used with the S.V.A. plane for passenger work from Stow Field. H. A. Kullberg is in charge of the Clark ships and is now at Stow permanently.

* * *

The Babcock Commercial owned by W. H. Sellers is now powered with an OXX6 motor, replacing the OX5 formerly used in the Akron built plane. Sellers uses his ship to service Ford motor cars in Northern Ohio farming districts, often landing in fields or pastures to talk with likely prospects.

* * *

The Manchester Road flying field near Akron has again been opened. Joe Esch and Bell Hawk are operating Canucks there for passenger hops.

* * *

Dr. M. A. Lanyard of Akron has ordered from the Babcock Co., a new high lift, three place plane with veneer fuselage, which is to be completed within a few weeks. An OXX6 will be used for the power plant.

* * *

Many requests to inspect the RS1 ,the first American semi-rigid ship now being completed in the aeronautical department of the Goodyear Tire & Rubber Co., have been received.

The RS1 is 282 ft. long, 70½ ft. in diameter, and has a gas capacity of 710,000 cu. ft.

* * *

The condition of August Little, Stow Field flier who slipped from the wheel of his plane into the propeller July 20, is reported improved by hospital authorities. His recovery was regarded as doubtful for several days following the accident.

* * *

A. Parker, who has recently been using Stow Field, returned last week from a trip over western Pennsylvania. He used a JN4D.

Philadelphia News

By C. T. Ludington

Some developments of importance in local aviation have occurred in the past weeks in Philadelphia.

The State has officially recognized the 103rd Observation Squadron of the 28th Division of the Pennsylvania National Guard. At last reports, Federal recognition was expected automatically in the very near future. General Price, Major Biddle, Captain Owens and others who have persevered in putting the Squadron across, deserve the heartiest congratulations. They have done the biggest thing that has been done for Philadelphia aviation.

On Tuesday, July 15, a meeting of the Philadelphia Chapter of the National Aeronautic Association was held. The Winslow Bill was discussed and the National Aeronautic Associa-

tion film, which has toured the Country with Admiral Fullam, was shown. To this part of the meeting, the Aero Club and the Engineers Club were invited.

* * *

Victor Dallin, with his Canuck, and Bob Hewitt, with his Sport Farman, have been flying to nearby towns to arouse interest in flying. Besides the propaganda end, they have met with some material success in that they have carried a number of perfectly good paying passengers. Over the week end of July 4, 5 and 6, these two held forth at Washington's Crossing, a few miles above Trenton on the Delaware River. They had secured an excellent field and the results were surprising. Passengers were carried without let-up during the entire three days, except when the two pilots found it imperative to stop and rest.

* * *

On Monday July 7, Wm. B. McCracken, Chairman of the Aviation Committee of the American Bar Association, landed at Pine Valley at 5 o'clock in the afternoon (E.S.T.), having left Cleveland in an Air Mail ship at 1:30 p. m. (C.S.T.) This feat met with a good reception on the part of the newspapers and did much to keep alive interest in Philadelphia's projected landing field. Mr. McCracken flew all the way from Chicago, leaving that place at 7:30 in the morning. He reached Philadelphia in time to have a swim before having his dinner. It is interesting to note that the time consumed in getting from Chicago to the Air Mail Field and in getting from Pine Valley to the center of the City here, amounted to approximately one-third of the flying time.

An informal luncheon to Mr. McCracken was attended by several of the officers of the Aero Club and Philadelphia Chapter of the National Aeronautic Association.

Chicago News

By R. W. Schroeder

The Heath Airport reports a good Sunday both of the ships being up most of the time. John Huber and LaPierre Cavender who again brought their ships to the field, went out of town over the week-end. The other ships were also out at other fields trying to get some of the Sunday business that everybody has been waiting for since last winter. Strange to say it did not rain Sunday and everybody got the business they expected.

* * *

Chris. Lund's field on Higgins Road is fast becoming the center of activities up our way. They announced a parachute jump for Sunday afternoon which drew a big crowd. Both their LS5's were busy all afternoon. The parachute jump was made by our daring friend John Daley, a young fellow about 20 years old and a friend of the Simplex Aircraft (Gus Palmquist). He jumped at about 1200 ft. and landed a little ways from the field unharmed, in spite of the fact that this was his first attempt and July 13 besides.

* * *

Ed LaParle, flying at Stanley Wallace's field on River Road also had a busy Sunday, carrying over 30 passengers with a Jennie. Stanley Wallace will have a ship of his own out in a week or two. The field which at first was reported as rather rough, is now in fine shape. The runways have been smoothed off as much as possible and the grass is being kept down. Several visiting ships dropped in at the field Sunday afternoon and landed and took off without the least bounce. This is a fine location and promises to become a popular field.

* * *

A newcomer at the Heath Airport is Frank Gill, who has just brought out his OX5 "special job." It also is of the high lift wing type and has a very small span and short fuselage. It is a very good looking ship, the fuselage and struts being varnished a brown mahogany, the wings light yellow and the tail surfaces a soft green. It will probably make its test flight during the next week. We are all anxiously awaiting the day.

* * *

R. C. Mossman of 6349 Stewart Avenue, has brought his "special job" to the big assembling room back of the Heath shop where he will finish it. This is going to be a three place high lift wing affair with OX5 motor.

Roy Ahern's ship was pretty badly damaged in a forced landing in the dump grounds back of the hangar, and is now being rebuilt. He will use Canuck wings instead of the regular Jennie wings.

Pittsburg News

By J. C. Wilson

Pittsburg has for more than two years been trying to secure a landing field. Such a field now seems to be assured. Next fall the city and county will jointly proceed to secure the property known as Rodgers Field by condemnation proceedings. Thanks to the support and cooperation of the Pittsburgh Chamber of Commerce and the untiring and well directed efforts of its special committee Pittsburgh will be on the Flying Map of the World by next summer.

* * *

Just a word about the Aero Club of Pittsburgh. We have now a membership of about two hundred and forty, eighty per cent of whom are ex-pilots or observers. We have luncheon every Thursday at noon at the Nixon Restaurant. An invitation is extended to all fliers who happen to be in Pittsburgh on Thursdays to come and have lunch with us.

* * *

The officers reserve camp is taking nineteen men from the Pittsburgh district to Langley Field. Seventeen of these are members of the Aero Club of Pittsburgh.

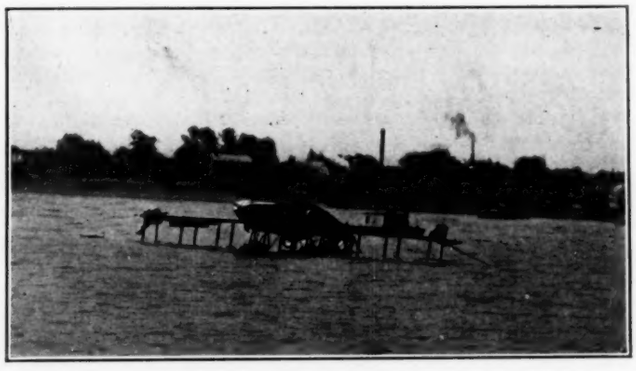
Old Orchard Flying Meet

Under the auspices of the C. F. Staples Post No. 57 of the American Legion, a flying meet will be held at Old Orchard, Me., on Aug. 29, 30, 31 and Sept. 1.

This is the second American Legion meet to be held at Old Orchard, the one last year having attracted 150,000 people to the town, and over 300 passengers were carried in a single day.

The field is a hard sand beach nearly 800 ft. wide at low tide and 8 mi. long. There will be prizes and trophies and a good opportunity to carry passengers.

For further details and entry blanks application should be made to Capt. H. M. Jones of Old Orchard, Me.



This F5L, while moored in shallow water was caught by a 72 mi. gale, with the result shown

Spokane News

By E. H. Partridge

Recruiting work for the local unit of the Ninth Corps National Guard unit has been completed and federal recognition will be sought at once. With the recognition, six planes and two hangars will be shipped.

* * *

D. R. Wallace, operating two ships from the Russell Flying field, has announced he will instruct and give solo flight to students at $100 for the course, plus cost of gas and oil, permitting solo work with his machine. Ken Geyer is pilot-instructor.

* * *

Pilot Nick Mamer has set up a Seagull on Coeur d'Alene Lake and will test fly it to determine whether it is suitable for his work. He also has a Standard with 150 hp. motor for cross country and taxi trips.

New Aerial Camera Invented

A new aerial camera, the invention of W. H. Hansom of Victoria, Australia, has just been completed at the engineering works of the Shaw-Ross Aviation Co., at Port Melbourne, Elmer G. Pauly, Assistant Trade Commissioner, Melbourne, informs the Department of Commerce.

The inventor claims that he has taken oblique photographs when flying at 126 mi./hr. The camera is very rapidly operated and on one occasion it is said took twelve photographs in three minutes when flying. The most original feature is the focussing—for the focus says the inventer can be instantly changed in the air between the limits of 10,000 ft. and 25 ft

Fairchild Has two new Camera Planes

The first American built camera planes have been delivered to the Fairchild Aerial Camera Corp. by the Huff Daland Co. of Ogdensburg, N. Y. Both of these machines are powered with the new Wright E4 190 hp. engine. One is a seaplane, and the other a land plane.

The seaplane was recently flown to Canada for delivery to the Fairchild Aerial Surveys Ltd. by Kenneth Saunders, pilot for this Canadian firm.

The land plane, piloted by Capt. R. H. Depew, manager of the Fairchild Flying Division, and carrying photographer A. O. Russell, arrived at Garden City, L. I. after a 340 mi. trip from Ogdensburg, in the course of which photos were taken at seventeen different places. Exclusive of the time taken on the photographic work, the 340 mi. flight was made at an average speed of 90 mi./hr. After exhaustive tests made at Ogdensburg, Captain Depew stated that these planes have proven very satisfactory. They have a ceiling of 15,000 ft. and a speed of 110 mi./hr. On one test with a one-half ton load, one of the machines reached an altitude of 13,000 ft.

The seaplane has twin floats so as to permit the taking of vertical photographs between them. It also has interchangeable landing gear, so that the floats may be taken off in the winter time and skiis attached for flying from frozen lakes and snow covered fields.

The engines are very satisfactory. It is possible for one man to remove all the engine cowl in less than one minute.

On the flight down from Ogdensburg, Captain Depew stated that due to the remarkable clearness of the atmosphere he was able to see the Thousand Islands and the head of Lake Ontario to the right of the machine; to the left, practically all of the Adirondack Mountains were visible. The machine was flying at a height of 8000 ft.

How to Use the Air Mail

To facilitate use of the day-and-a-half coast to coast Air Mail service, nine letter boxes bearing red, white and blue stripes have been placed at different points in New York City.

The new air mail boxes are in the General Post Office, Pennsylvania Station, Grand Central Terminal and City Hall Park; at Broadway and Wall Street, Broadway and 23d Street, Broadway and 42d Street, Fifth Avenue and 34th Street and Fifth Avenue and 42d Street.

Mail placed in these or in ordinary letter boxes is daily collected about 8 a. m. and taken to Hazelhurst Field, L. I., where it leaves at 11 a. m. by airplane along the established postal air route. The schedule calls for arrival at the Golden Gate at 5:45 the following afternoon.

Eastbound mail leaves San Francisco at 6 a. m. and reaches New York about 2 p. m. the next day. Mail is dropped and picked up at each of the thirteen regular stops, where it is transferred to and from railroad mail routes. The thirteen transfer and refueling stations on the sky route are Bellefonte, Cleveland, Bryan, Chicago, Iowa City, Omaha, North Platte, Cheyenne, Rawlins, Rock Springs, Salt Lake City, Elko, Reno, and San Francisco.

Ordinary stamps suffice, and the special mail boxes need be used only by last minute mailers, but the mail must be plainly marked "Via Air Mail."

Whenever necessary, an additional plane will be pressed into service to carry heavy shipments of mail. Packages up to a 50 in. measurement of combined length and girth will be carried at the rate of 8 cents an ounce for each of the three zones, or part of zone.

Czechoslovak Aircraft Exposition

The third annual Czechoslovak Aircraft Exposition, held in Prague between May 31 and June 9, offered visitors ample proof of the great progress made by native designers in aircraft construction. Airplanes of all types were exhibited by the three existing Czechoslovak aircraft manufactures—Aero, the government aircraft factory and Avia—the last named alone exhibiting eleven different types. Among these ships there were pursuit machines, sport planes, training planes, two-seater corps observation planes and even a light plane. All these ships are strut braced low wing monoplanes and several of them are equipped with a new radial engine of Czechoslovak manufacture, the 60 hp. Walter. A new Czechoslovak aircraft engine firm, Breitfeld Danek & Co. of Prague, exhibited a series of aeronautical power plants ranging from 100 hp. to 450 hp. The Skoda gun factory—which during the war of 1914-18 were the Austrian equivalent of Krupp's—exhibited a 300 hp. Hispano-Suiza engine, manufactured under license.

Line-up of commercial planes at Stow Aviation Field, Akron, Ohio

Considering that the Czechoslovak Republic had no aircraft industry in 1919, when it broke away from the Austrian Empire and established its independence, and that today its air force of twelve squadrons is entirely equipped with machines of national manufacture whose performance is sensibly the equal of the best Europe has to offer, the great strides of this country in aircraft construction will be appreciated.

The British, French and German aircraft industries were also well represented at the Prague exposition.

Air Mail To Carry Registered Articles

Postmaster General New announced July 15 that, following demands from all parts of the country, registered articles, containing non-negotiable securities and certain commerical papers will hereafter be acceptable for transportation by airplane service. The Postal Laws and Regulations will be so amended to permit the transportation of such securities by airplane mail in the future.

Commercial paper will be accepted for transportation by air mail which is not made payable to bearer or is not indorsed or, if indorsed, is not indorsed in blank without regard to the value involved.

Coin and currency in large amounts, negotiable securities and commercial paper in large amounts which may easily be negotiated or readily realized upon by other than the rightful owners will not, however, be accepted for registration and transmission by airplane service.

The original registration receipts and mailing office registration records of articles accepted for registration for transmission by airplane service must be indorsed "via Air Mail." Postmasters will be called upon to report separately the number of registered articles accepted for transmission by airplane service, domestic and international.

When special airplane stamps are not used to prepay the airplane postage, the address side of the article must be plainly marked "via Air Mail."

UNITED STATES AIR FORCES

U. S. ARMY AIR SERVICE

Army Air Orders

Spec. Orders May 26 amended to direct Capt. Calvin E. Giffin, A.S., upon leave of absence to proceed from Kelly Field to San Francisco, sailing on transport for Hawaii Oct. 18.

First Lt. Devereux M. Myers, A.S., Aberdeen Prov. Ground, Md., to San Francisco, sailing on transport Oct. 15 for Manila, P. I.

Spec. Orders, May 27, relieving Maj. Leonard H. Drennan, A.S., from duty in office Ch. A.S. and directing him to proceed to Post Field, revoked.

The appointment as Sec. Lieuts. of the following cadets, graduates of the U. S. Mil. Academy, and their assignment to the A. S. is announced: Leonard Henry Rodieck, Alexander George Greig, George Edward Lighteap, jr., Paul Albert Pickhardt and Richard Garner Thomas, jr.

The appointment as Sec. Lieuts. of the following cadets, graduates of the U. S. Mil. Academy, and their assignment to A.S., duty Brooks Field, upon expiration of leave granted, are announced: Albert Fox Glenn, Brooksville, Miss.; Earle Everard Partridge, Ashby, Mass.; Fred Arley Ingalls, De Soto, Mo.; Herbert Theodore Schafer, Buena Vista, Ia.; Robin Bernard Pape, Waterbury, Conn.; Clyde Massey, Falls City, Neb.; Robert Lyle Brookings, Duquoin, Ill.; Eugene Barber Bieher, Hackensack, N. J.; Leo Douglas Vichules, Northampton, Mass.; Uzal Girard Ent, Northumberland, Pa.; Worth Harper, Macksville, W. Va.; Donald Dean Rule, Spokane, Wash.; James Frederick Howell, jr., Fort Monroe, Va.; Stephen Stanley Koszewski, Milwaukee; John Phillips Kirkendall, Dallas, Pa.; Joseph Aloysius Kielty, Wilkes-Barre; Robert Roy Selway, jr., San Diego; Leslie Edwards Poore, jr., Washington; Washington Mackey Ives, jr., Lake City, Fla.; John Jacob Williams, Moab, Utah; Luther Stephens Smith, Troy, N. C.; Warfield Richardson Wood, Birmingham, Ala.; Howard McMath Turner, Avoca, Ia.; John Lyman Hitchings, N. Y.; Kenneth Crawford Strother, Winfield, Kans.; Edward Higgins White, Fort Wayne, Ind.; James Hewins, jr., Waban, Mass.; Denis James Mulligan, Riverdale-on-Hudson; William Olmstead Eareckson, Walbrook, Md.; Francis Robert Stevens, Columbia. Miss.; Richard Weigand Gibson, Butler, Miss.; George Almond Ford, Roanoke, Va.; Felix Marcinski, Baltimore; Rupert Davidson Graves, Peabody, Mass.; John Reynolds Hawkins, Millersburg, Ky.; Ralph Emanuel Fisher, Norton, Kans.; John Harold Claybrook, jr., Perry, Tex.; Francis William Johnson, Lynn; Ralph Arthur Koch, St. Louis; George James Smith, Brooklyn; John O'Day Murtaugh, Elmira, N. Y.; Arthur LeRoy Bump, Jr., Phila.; William John Renn, jr., New Albany, Ind.; Peter Sather, Nome, Alaska; Irving Ballard Greene, Carmel, N. Y.; Frank Faron Carpenter, jr., Pasadena; Harold Currie King, N. Y.; Richard Gernant Herbine, Reading; Ralph Houston Lawter, Huntington, W. Va.; Noah Matthew Brinson, Cobbtown, Ga.; Leighton Marion Clark, Portersville, Cal.; Cornelius Walter Cousland, Hurley, N. M.

Capt. Robert Fulton Raymond, Jr., A.S., Off. Res. Corps, Newton Center, Mass., to active duty Mitchel Field, reverting to inactive status Aug. 5.

Maj. Robert Coker, A.S., designated Asst. Com. Bal. & Airship Sch., Scott Field, in addition to other duties.

Lt. Col. Rush B. Lincoln, A.S., relieved from duty as Asst. Com. Bal. & Airship Sch., Scott Field.

Sec. Lt. Lloyd E. Hunting, A.S., A.S., Prim. Fly. Sch., Brooks Field, to temp. duty Commanding Off., Brooks Field. Expiration temp. duty to A. S. Prim. Fly. Sch. for instr.

First Lt. Charles R. Evans, A.S., from A. S. Prim. Fly. Sch. Brooks Field, to Com. Off. Kelly Field for instr. Observ. Sch.

First Lieut. George H. Burgess is designated as model airway communications control officer.

Sec. Lt. John Patrick Cody, A.S., A. S. Off. Res. Corps, Washington, to active duty Ch. A. S., Washington, reverting to inactive status Aug. 11.

Lt. Col. Lyle S. Powell, A.S., A. S. Off. Res. Corps, Omaha, Neb., to active duty Com. Off. Richards Field for training, reverting to inactive status Aug. 10.

New Radio Set

The recently demonstrated Army Air Service radio transmitting and receiving set for observation planes, is remarkable for its lightness, weighing only 110 pounds without the batteries. It is also compact, as all airplane sets have to be, and provides for both sending and receiving. It is controlled by a single 3-way switch in the observer's cockpit. A remote-control switch also operates the transmitting power plant when thrown by the operator.

The transmitter, which is composed of three major parts, uses four tubes and a master-oscillator circuit, and has a wave band of approximately 500 Kcs. Three means of sending signals are provided: telephone, telegraph with CW, and telegraph with ICW, with a number of various pitched tones.

The receiving equipment, also of three major parts, is basically a superheterodyne of eight tubes. The amplifying unit is remotely controlled from the tuner box, and has a reception band of from 200 to 1200 m. The receiving tuner box has only three adjustments—filament, heterodyning, calibrated in Kcs, and antenna tuning adjustment.

In recent tests by Signal Corps and Air Service experts between the airplane and the ground a distance of 90 mi. has been traversed by messages from the air. With the superheterodyne receiver, operating against the roar of engine and ignition interference from a twelve cylinder Liberty Engine, reception by the plane operator has accomplished over a distance of 150 mi. from low-power transmitters. Broadcasting stations all over the country have been received by the plane while in the air.

In a special test of these receivers in two fast, single-seater planes traveling at about 150 mi./hr. and doing maneuvers and acrobatics, perfect telephone conversation was maintained, using only wing-tip antenna. A plane doing acrobatics, could not employ a trailing antenna as it would in straight and level flying.

The lightness of the set is due chiefly to the use of especially constructed laminated wood of great strength and through the use of duralumin. Careful design of each individual part of the radio equipment has also had considerable to do with the lightness of these airplane sets.

CALENDAR OF AERONAUTICAL EVENTS

March 25.	Start of the British World Flight, Southampton, England.
April 6.	Start of World Flight of the U. S. Army Air Service, Seattle.
August.	"Tour de France des Avionnettes." International Round-France race for light airplanes.
Oct. 2-4.	International Air Races, incl. Pulitzer Trophy Race, Dayton, Ohio.
Oct. 24-25.	Schneider Cup Race, Baltimore.
Dec. 17.	Twenty-first anniversary of the first successful airplane flight.

U. S. NAVAL AVIATION

Naval Air Orders

Lt. Gerald F. Bogan, det. Nav. Trng. Sta., N.O.B., Hampton Roads, to temp. duty under instr. in aviation.

Lt. Thomas G. W. Settle, det. Bu. of Eng., Navy Dept., to Naval Air Sta., Lakehurst, N. J., involving flying.

Lt. (jg) Harold Coldwell, det. U.S.S. Omaha, to temp. duty under instruction in aviation, Naval A. Sta., Pensacola.

Lt. (jg)Grover B. H. Hall, det. U.S.S. Robert Smith, to temp. duty under instruction in aviation, Naval A. Sta., Pensacola.

Lt. (jg) Rowland D. Hill, det. U.S.S. Langley, to temp. duty under instruction in aviation, Naval Air Station, Pensacola.

Ens. Gus F. Berner, det. U.S.S. Melvin, to temp. duty under instr. aviation Nav. A. Sta., Pensacola.

Ens. Ward. C. Gilbert, det. U.S.S. Selfridge, to temp. duty under instr. aviation Nav. A. Sta., Pensacola.

Ens. Frank R. Walker, det. U.S.S. Oklahoma, to temp. duty under instr. aviation, Nav. A. Sta., Pensacola.

Ens. Cecil C. Adell, det. Naval Aircraft Factory, Navy Yard, Phila., to temp. duty under instr. aviation, Nav. A. Sta., Pensacola.

Ens. Harold C. Hazard, det. U.S.S. Bainbridge, to temp. duty under instr. aviation, Nav. A. Sta., Pensacola.

Ens. Howard L. Jennings, det. U.S.S. Charles Ausburne, to temp. duty under instr. Nav. A. Sta., Pensacola.

Ens. Rudolph L. Johnson, det. Battleship Div., Battle Fleet, to instr. aviation Nav. A. Sta., Pensacola.

Ens. Valvin R. Sinclair, det. U.S.S. Bainbridge, to temp. duty under instr. aviation, Nav. A. Sta., Pensacola.

Ens. Walter E. Zimmermann, det. U.S.S. Charles Ausburne, to temp duty instr. aviation, Nav. A. Sta., Pensacola.

Lt. (jg) Hezekiah W. Carroll, det. U.S.S. Richmond, to temp. duty instr. aviation, Nav. A. Sta., Pensacola.

Ens. John K. Lynch, det. Nav. A. Sta., Pensacola, to U.S.S. Sloat.

Lt. Lawrence B. Richardson, det. Insptr. Nav. Aircraft, L.W.F. Engr. Co., College Point, to temp. duty instr. aviation Nav. A. Sta., Pensacola.

Ens. William C. Gray, det. U.S.S. Mississippi, to temp. duty under instr. in aviation, Nav. A. S. Pensacola, Fla.

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A Suggested National Air Policy

That a National Aviation Policy is needed by the United States is obvious. To get such a policy in concrete form AVIATION *requested several thoughtful friends of aeronautical progress to make suggestive and constructive recommendations. Some of them are given below and will be printed each week with additions, omissions and such other changes as appear to be helpful toward the formulation of a sound national air policy. Readers of* AVIATION *and others can render no greater service to the cause of aeronautical progress than contributing their comments and suggestions.*

GOVERNMENTAL.

A continuing program of aircraft development both governmental and commercial.

A civilian, charged with championing a national air policy, is needed in the Government.

Aircraft committees in the House and Senate to hold aircraft hearings where civilians as well as government officials can express their opinions.

A detailed aircraft budget for all Governmental Departments, and an annual statement of all expenditures.

An experienced staff of flying officers at the head of all governmental air defense services.

Coördination of all procurement and experimental aircraft work of the government under one agency.

Limitation of government manufacture to repair of aircraft and specialized work that cannot be done by private firms.

The elimination of the duplication of aerial functions and facilities by government departments.

A country wide Air Mail system of trunk lines connecting the principal cities of the country.

Establishment of a National Airway System through cooperation of the Federal Government with States and Cities.

A national aircraft law that will regulate aviation, administered by practical pilots and experienced aeronautical engineers.

Membership of the United States in the International Convention for Air Navigation.

COMMERCIAL AIRCRAFT OPERATION.

Creation of commercial air lines by private enterprise or government subsidy.

Encouragement of participation by private companies in aircraft races and competitions.

Encouragement of the training of pilots by civilian schools.

Creating an Esprit de Corps among flying men all over the country by frequent gatherings at aviation meets.

INDUSTRIAL AIRCRAFT CONSTRUCTION.

Recognition that a sound aeronautical industry is a prime necessity of our National Defense.

An active industrial association that will coordinate the aircraft industry and defend it from attack.

Encouragement of the designing of new types of aircraft by manufacturers by allowing them to retain their proprietory rights.

Concentration of manufacturing firms on specialized types of army and navy aircraft.

Encouragement of research by constructors, universities and other agencies as well as by the government.

Encouragement of an annual design competition for commercial aircraft.

CIVILIAN.

A national aeronautical organization composed of public spirited citizens that will take a strong position of leadership on national aeronautical policy.

An Annual Aviation Week during which the country will think of aerial progress.

The formation of local aero clubs by fliers for the purpose of stimulating flying in all localities.

Encouraging the public to fly and patronize the air mail and transport facilities.

PUBLISHER'S NEWS LETTER

Occasionally some striking bit of business philosophy has such a particular appeal that it does not seem inappropriate to include it in the columns of a trade paper.

Considered from the aviation viewpoint there is much that is pertinent in the list that is here printed.

"Twelve Things to Remember":

The Value of Time.
The Joy of Originating.
The Success of Perseverance.
The Wisdom of Economy.
The Pleasure of Working.
The Importance of Talent.
The Dignity of Simplicity.
The Worth of Character.
The Power of Kindness.
The Influence of Example.
The Obligation of Duty.
The Virtue of Patience.

If the principles that are so pithily expressed in this code were considered more often in aeronautical work, there would be a little more joy in our little world.

* * * *

A letter, typical of many that have been received, is reprinted below as evidence of the value of giving publicity to the cost of our governmental air defense.

"Allow me to express a word of appreciation for your courageous and unequivocal stand on the subject of Air Service Appropriations. Until your calling your readers' attention to the facts as disclosed before Congress I, along, no doubt, with hundreds of others, supposed that McCook Field was a struggling, underfed infant, doing its best with the meager appropriations available to direct and keep an honest check and influence for proper standardization on the industry. I supposed that the Air Service's lack of service ships was entirely attributable to the short-sightedness of a vote-seeking Congress and have often expressed such an opinion in conversation. I have always considered Congress more or less responsible for the crime being perpetrated upon our fliers in the Air Service, namely that of forcing them to fly worn out war time ships long since worthy of the junk pile. It was only a few months over a year ago that I myself (if you will pardon a personal allusion) lost the motor out of an SE (British built) at two hundred feet when pulling out of a reasonable dive from 1000 feet during bombing practice.

"Although they were temporarily condemned at the time I notice that they are still being flown! What rankles is that this must be laid at the door of the Air Service itself and not at that of Congress! Congress might be excused on the grounds of lack of information or pressure but such a plea can not by any means be made for our Air Service."

* * * *

Our readers can imagine our feelings when we found that there had been a six million dollar error made in the figures that were given to Congress, the correct figures appearing elsewhere in this issue. It must be evident to everyone that only one purpose can be served by not having the costs of governmental aviation in clear and intelligible as well as accurate form so that they can be analyzed and studied. That purpose is either confusion or fear.

* * * *

The public is entitled to know what it is getting for what it spends. It can fairly ask officers that it entrusts with large appropriations to give an accurate and clear accounting. Giving as much as is called for by Congressional Committees is hardly sufficient, as these committees often are not well enough informed to interpret the costs, nor have they as much interest in where the appropriations have been spent as how they can be curtailed.

Publicity such as is given in the detailed British Air Estimates is what is needed and it now appears that an effort is being made to compile this information in an accurate manner. Those who thought that the publication of these costs by AVIATION might tend to make our appropriations less, must now see that the result will be to show how little actual equipment the country is getting for the money it spends. Similar figures from the Navy would permit of comparative study which would be helpful.

* * * *

The call for the annual meeting of the N.A.A. has been sent to members. It is as cheerful as the conditions will permit. AVIATION has unfortunately not been able this year to give glowing accounts of the progress of the organization. Perhaps the mistakes that have been made and the need of some specific policy will awaken in the minds of the members a plan for the coming year which will fit into the admittedly necessary niche that the N.A.A. should occupy.

It must be evident that the N.A.A. must cooperate with existing agencies more than it has in the past. It must plan its work so that such a great part will not be centered in one big race meet and one convention. More meetings of officers and members should take place if the N.A.A. is to function with success. The officers must assume leadership and not allow the financial problem so to predominate as to retard the whole progress of the work.

A very general opinion is being expressed that the N.A.A. should confine itself to what can be best expressed as the duties of the Contest Committee, at least until popular support can be secured in greater measure than in its first two years. Fewer than five thousand members, giving an income of $20,000 a year, will not permit of a large organization. As Orville Wright has assumed charge of the Contest Committee it might be an opportune time to try a modified plan of operation. The members would feel that they were doing a useful service if it were only to have Orville Wright in charge of the main activity of the N.A.A.—L.D.G.

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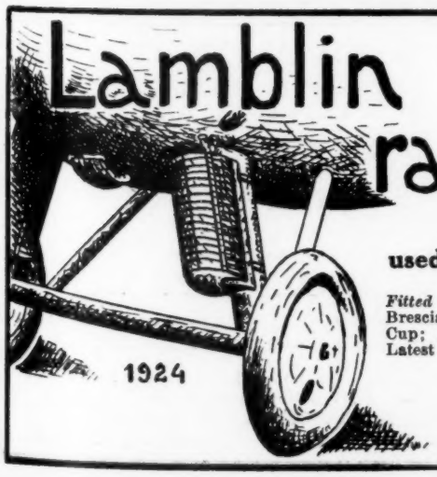

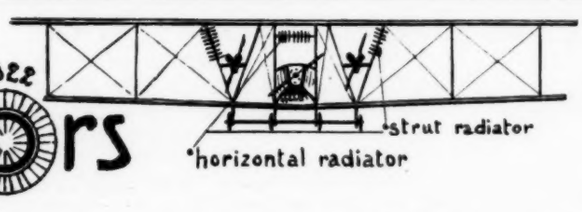

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